

INTERSTATE MEDICAL JOURNAL.

Vol. XV.

JUNE, 1908.

No. 6

EDITORIAL.

THE ANTIVIVISECTION AGITATION.

The constitutionality of antivivisection laws should be well considered by those lawyers who are so intent upon placing such enactments on the statutes. The very basis of American civilization is equality before the law, and any law which can be enforced against one class and not against another is also repugnant to our instincts of fair play. Indeed such laws are so dangerous to our personal liberties that there is no other matter upon which higher courts are so keenly interested. Without a known exception class legislation is either declared unconstitutional or becomes a dead-letter through the impossibility of carrying it out. Should any official desire to enforce the laws impartially against all, he finds it impossible to do so and he gives up the attempt to enforce them against anyone. These results will inevitably follow in the case of antivivisection laws which single out scientists for restriction in their rare uses of the knife—for what is called vivisection is not always cutting and slashing, as the fanatics assert—and yet place no restriction upon farmers in their far more painful cutting and more numerous operations upon domestic animals. If a scientist working to save human life must use an anesthetic when he makes a tiny incision, it will be class legislation of the most vicious kind, if farmers are not compelled to use anesthesia when they make the huge slashes to remove the testicles of a calf. Of course such a law of general application would be absurdly quixotic and women indeed cannot be expected to enter enthusiastically into any crusade for making castration painless. To introduce such a provision into any bill would cause its prompt rejection, but failure to introduce it will render the law unconstitutional class legislation. The whole agitation should be dropped and the sooner the better.

Legislators have been deceived into believing that there is a widespread public opinion demanding regulation of animal experimentation. As a matter of fact there is no such demand, even among thinking people. The few fanatics who make all the noise have deceived themselves into

the belief that there is an abuse which must be corrected. Such zoophilia is merely a symptom of a neurotic condition calling for medical treatment. The Society for the Prevention and Abuse in Animal Experimentation would be better employed if it devoted its energies to something really needing reform, and not to an alleged abuse which exists only in their own minds. Over half the babies are doomed to early death and the process of killing them is very painful. Why not devote to them the time and labor now spent in abusing the scientists, who are trying to save the poor little innocents so uselessly slaughtered by ignorant mothers? "Suffer little children to come unto me" is a divine command in more senses than the theological one, for it is a demand of civilization. Are a few guinea pigs of such importance that they must receive attention while the slaughter of the innocents continues in a manner which out-Herods Herod?

Nevertheless, there is a beginning of reason among the fanatics for their proposed laws exempt all operations for the production of serums. Yet while acknowledging successful experiments, they most illogically try to place restrictions upon investigations to develop new serums,—the very work which should be unrestricted to obtain the truth.

RECENT INNOVATIONS IN PHTHISIO-THERAPY.

Graduated work, instead of rest for the tuberculous, is another of those startling things which have been so rudely jolting the orthodox out of their ruts. The persistence with which these reversals of practice have been recently disturbing us, is proof that the old ideas of treatment have not been based on all the facts, but merely on some of them. It is not proof that medicine is "at the bottom a mere matter of fashion," and "more or less of a comedy," as stated in the Paris letter published in the *Boston Med. and Surg. Journal* (Feb. 2, 1908). All sciences from chemistry to pathology form theories to account for all the known facts, and when a new fact is found, theories change to include it. The frequency of change in theory is evidence of healthy growth of science, and the great changes of recent decades are due to the enormous number of men now devoting their lives to digging out new facts. Fifty years ago when medical theories changed but slowly, there were many practitioners but few investigators, whereas now the research workers are legion.

The theory of rest in phthisio-therapy was based on the fact that we wished to reduce expenditures so that all the food could be applied to tissue building. The bacilli are then promptly destroyed by the strengthened tissues. The great objection to it is that upon cure, the poor patient is not able to return to work and his normal conditions of life.

"Some young firebrands in London connected with Brompton and its county sanatorium Frimley" are now resting their patients only in acute periods, when there is hæmorrhage or fever, but compelling them to work indoors or outdoors all the rest of the time,—the work being graduated from mere walking to such severe labor as masonry! When cured the patient is able to make his living—indeed he has been doing it while being cured.

The theory of graduated exercises in tuberculosis is reported to be the release of bacterial vaccines by the increased circulation, and the same good results are found as from tuberculin properly administered. Moreover opsonic tests reveal whether enough or too much has been released, and thus regulate the work, though experience shows that the patient's appearance and even his feelings can be safely depended upon. Results are said to be excellent. The feeding is merely ordinary diet with no stuffing, and fresh air is not made the main feature. What a tremendous change from the time when consumptives were confined to close rooms and kept drunk with whiskey.

The benefit of cold air has never been explained, but it must be re-examined in connection with the method of graduated work. It is common knowledge that the congested lungs of persons with small chests and big hearts rarely become tubercular, but that the anæmic lungs of the typical tubercular, big chests and small hearts are highly susceptible, and Geyser's method of increasing passive congestion as explained in *American Medicine* for February, not only seems rational but is apparently successful. It does seem that cold air likewise increases the congestion and may be beneficial for that reason. All methods of increasing the blood supply may then really be means of releasing vaccines which immunize the tissues, in the same manner as breathing exercises and graduated work. What an optimistic outlook there is for the further development of the tuberculin treatment to do directly what all these methods are doing in such a roundabout way. There is already in sight the possibility of curing tuberculosis as surely as diphtheria, and in this direction all investigators seem to be instinctively working.

The effect of light in tuberculosis must also be re-examined. In cloudy places where the sun rarely shines, Trudeau and many others have attained excellent results showing that the old idea that light was an essential in treatment was a baseless theory and though it still lingers in the text-books, there is less heard of it in America and none at all in Europe where cloudiness does not seem to affect the results in the least. Attention has been called to the experiments in the Finsen Copenhagen Institute, which show that the light used in curing lupus is too weak to kill or even injure the bacilli. It was then assumed that the cure was

obtained by the lethal effect upon the more susceptible pathologic cells and a stimulation of the connective tissue cells which thereupon replaced the atypic new growth by scar tissue in the same way that superficial cancers react to radium as applied by Abbe in New York.

A new explanation of Finsen's cures is offered by a Frenchman,—who makes the suggestion that strong light merely irritates the tissues sufficiently to cause a congestion, and that any other irritant is just as curative if it causes congestion. If this is true the phenomenon is of the same order as all the other methods of curing tuberculosis. On the other hand, the light bath to the whole body causes superficial congestion and draws the blood from the interior producing there a grade of anæmia which partly accounts for the bad results of excessive exposure. An increasing number of physicians are reporting adverse results of too much sunshine particularly in blonds and are empirically shading their patients in summer and in light climates. Perhaps indeed cold climates are beneficial from the emptying of the superficial vessels, while hot climates like the Philippines are so dreadfully fatal to consumptives, from the large amount of blood drawn into relaxed capillaries of the flabby skin. Truly these new firebrands of London, who are curing their cases and returning them to work, are compelling a revision of theories. Perhaps Bier has builded better than he knew.

NON-RESTRAINT IN TREATING THE INSANE.

Considerable professional attention has always been directed towards the proper methods of managing the insane, but the publication of a book on the subject by a cured patient describing his own experiences while an inmate of several institutions has created unusual interest among laymen (*A Mind That Found Itself*, Clifford W. Beers). In mental diseases the patient is unable to describe his symptoms accurately even if he so desires, and most of our knowledge is based upon the objective symptoms together with such peeps into the mental interior as these afford. The insanities therefore have never been wholly understood and though an enormous amount of study has been given the subject in the last fifty years, the impossibility of placing one's self in the exact position of the patient to look out upon the world as he does will always prevent accurate conceptions of the mental processes. It is then of unique importance to obtain from a recovered patient a well written description of what he remembers of his illness and its treatment. The work gives every evidence of being a truthful narrative of what the writer thinks were the exact facts and it is a fascinating story of manic-depressive insanity. It is not necessarily the truth, for even a sane man can rarely describe things as they are. When the witness has been so

desperately ill as to be insane it is of course out of the question to accept his statements as the exact facts. To the trained alienist who can read between the lines and interpret the story, this unique book is simply invaluable but to the lay reader who knows nothing of insanity it is misleading in the extreme. It is regrettable that the objective story—that of the hospital doctors—was not written and published as part of the work, for then greater weight would be given to the author's very sane and valuable suggestions as to the abuses in the treatment of the insane.

Although hospitals for the insane have undergone a tremendous change since the time when these invalids were loaded with chains and confined in dark cells, there are still abuses to be corrected and always will be, for the ideal management of today will be considered even brutal a century hence. A perpetual crusade is necessary to effect reforms.

In one respect Beer's book is bound to do great harm. It gives the impression that asylums are much worse than they really are. It is idle to deny that abuses exist and are concealed from the physicians in charge, for the work of an attendant is so nerve-racking that judgment is sure to be weakened and more or less brutality indulged in, but the impression given is that such conditions are well nigh universal. Considering the immense number of insane now in confinement there is a surprisingly small percentage of known cases of abuse. The extended newspaper notice of them gives an incorrect idea of their prevalence.

Many forms of insanity merely disarrange or shunt off parts of the thinking apparatus. The thoughts are all more or less warped, of course, but the patient feels, sees and hears, and can enjoy or suffer—many of them quite keenly—and some are delightful companions whose sympathy for others can also be utilized for their own cure. That is, modern treatment recognizes and uses the patient's thinking and feeling capacities. If there is any act of brutality or injustice, the patient is sure to be vindictive and commit offenses in retaliation, for he is guided by his emotions, having lost more or less of his inhibition. Unfortunately the expense of high grade attendants to carry out modern methods is so inordinate that there would be an outcry from tax payers, who would not tolerate the outlay. It is really a field for philanthropy. Perhaps the expense would be within bounds if the courts could compel the family to support insane relatives—at least paying for board and lodging. The state must pay a share, no doubt, as the patients are deprived of liberty to protect society, but it is popularly believed that the family has no obligation in the matter at all. If they were compelled to share the burden it is quite likely that better methods could be carried out and a higher percentage of cures obtained.

The most amazing part of the story is its revelation of the manner in

which a highly neurotic boy of a neurotic family, and having an epileptic brother, was forced through Yale when he should have been leading an out-door life, freed of all causes of nerve exhaustion. This part is a dreadful reflection upon our mania for education and the profound popular ignorance of hygienic living. Whether or not there is need for a national society to carry on a crusade for the prevention and cure of insanity, in the same manner as the antituberculosis crusade, is debatable, but the very fact that this case may not have had so early or severe a break down if proper out-door life had been his lot, indicates that there is at least room for a campaign of education as to mental hygiene. If we cannot give treatment to the wrecks who are still at large we might at least prevent future cases.

THE DOCTOR'S OBSERVATIONS IN HEREDITY.

The wasted experience of general practitioners is well nigh a disaster to exact science, for it seems a rule to carry our rich possessions to the grave leaving absolutely nothing recorded for the benefit of humanity. To be sure, the busy doctor finds little time for writing out his observations, and few are gifted with the faculty of generalizing from their own, facts which appear unduly important as compared with facts seen by others. Nevertheless every man who has had thirty or forty years practice surely has had many parallel cases which he could group together, and there surely must be times every day when a few minutes can be snatched to write down some salient fact which has been noted during the day. In course of time the records would become of inestimable value, and would also serve as a check to the memory which becomes so unreliable as we grow older that we cannot depend upon our own generalizations.

Studies in heredity have now become of the highest importance for it has at last been recognized that an enormous number of things we once considered as evidence of an unavoidable heredity are nothing of the sort, but merely result from the fact that the son has been injured by the same environment as the father. Seafaring races are prone to death by shipwreck, and if after begetting children the sailor dies in this manner, and these in their turn do likewise, it does not prove that death by shipwreck is an hereditary complaint. Yet what we call hereditary diseases are often classed as such on no better basis. When the cause is discovered and removed the "hereditary taint" disappears. That is, we have so misused the term that we have actually referred to "hereditary sterility" to account for the families in which a few members in each generation are childless and the family name is preserved by side lines. It is just in these cases where the old experienced family

physician has such a wealth of material from which he could definitely declare what types had perished and what survived. Then it might be possible to determine the reason for the fatality and prevent it.

The alleged inferiority of the first born is published by Karl Pearson as one of the many results of his method of studying the statistics of tuberculosis. It is charged that the elder children are so much more prone to the disease, as to indicate decidedly weaker constitutions. It has been argued from these facts and conclusions that small families are therefore weakening the race, and that married folk should keep on producing children so as to have the stronger later born keep up the stock. A more pitiful illustration of the misuse of statistics could scarcely be imagined—even assuming that the facts are as stated. In view of the other evil results of excessive child-bearing, it would be just as logical to postpone marriage until the age at which the best offspring are produced—assuming again that marriage is for the sole purpose of increasing a population already so congested that many fail to secure the necessities of existence. It is here again that the elder physicians have a wealth of data from which to determine whether it is really true that the elder children are the best for survival, omitting all reference of course to any discussion as to whether the best for survival are the best for any other purpose on earth. It may turn out that the world has been more improved by those who died young and left few offspring, than by those who survived to spend twenty or thirty years in a senile dementia—burdens to their families if not also to themselves. Facts are needed and the medical profession can supply them if it only would. It has been asserted that child-bearing causes so much exhaustion that the later born are feebler than the elder children and more prone to tuberculosis, so that Pearson's conclusions are surprising and need checking up by more extensive data. The practical results are of sufficient importance to warrant early work in this direction for it is quite possible that the choice of a profession by young men might be more wisely made under the doctor's advice.

LITERARY NOTES.

J. Arthur Thompson, M. A., Professor of Natural History in the University of Aberdeen, is the author of a book on "Heredity," recently published by G. P. Putnam's Sons, New York. Of all subjects which have a perennial interest for physicians, we doubt if any equals in importance that of heredity. Though the land occupied by the many theories has been more debatable than any other, the time seems to have arrived when a solution of the mighty problems affecting this subject is at hand. And this is due to the son of Austrian peasants, Gregor

Johann Mendel, who was born in 1822. One speaks of this genius with considerable awe, for his unostentation during the years spent in his cloister, when he prosecuted his studies in regard to hybridisation experiments with peas and other plants in the garden of the monastery, is without parallel in the history of science. Two papers, one dealing with peas and a shorter one with hawkweeds, and some meteorological observations, are the sum substance of his labors, but the results affecting the real theory of heredity are so great, that students no longer regard the theories of Darwin, Huxley and Weismann with the same degree of enthusiasm. Truly, Mendelism is epoch-making, and that it has "arrived" as the French say, is not only evidenced in the exhaustive work of J. Arthur Thompson, but in a number of biographies and magazine articles which have recently been published to show the qualitative work of the obscure priest, whose fame was not known to the world until brought before it by De Vries, Correns and Tschermak, in 1900.

The Proceedings of the Royal Society of Medicine (Longmans, Green & Co., New York) for November and December, are publications which should not be overlooked by physicians who wish to keep abreast of the times. As is known to many, the Royal Society of Medicine was formed in June, 1907, by the amalgamation of the following London Medical Societies: The Royal Medical and Chirurgical Society, The Pathological Society, The Epidemiological Society, The Odontological Society of Great Britain, The Obstetrical Society, The Clinical Society, The Dermatological Society, The British Gynaecological Society, The Neurological Society, The British Laryngological, Rhinological and Otological Association, The Laryngological Society, The Dermatological Society of Great Britain and Ireland, The Otological Society of the United Kingdom, The British Electro-therapeutic Society and The Therapeutical Society. An alliance such as this is necessarily one that can have only the best results, and if the numbers at hand are criteria of future issues, the medical world has cause to congratulate itself on the addition to its present monthly publications, of one of the most satisfactory journals that the critical amongst us could desire.

A very readable book, indeed, is Ronald Campbell Macfie's "The Romance of Medicine" recently published by Cassell and Company, New York. Not forgetting the fact that serious readers in the province of medicine, generally look askance at medical publications that are written in the popular manner, we can say of this book that it can be read with profit even by the most serious student, for it has many qualities, both literary and scientific, which place it far above the usual popular scientific

publication. The best chapters are those on The Microbe: Its Discovery and Origin; Bacteria; and Representative Microbes; while the weakest is the last chapter, Surgery and Medicine: Their Present and Future. It would seem that the author having kept up a high tenor of literary and scientific excellence, allowed himself to lapse, at the close of his book, into a style of writing that has always prejudiced us against medical books of the popular sort. Now this one blemish, though grave by contrast with the general excellence of the work, should not make any reader unwilling to peruse its pages, for the lessons to be gathered are many and fruitful, and the revelation that medicine reached the apogee of its Romance in probably the most prosaic period in history, namely, the latter half of the 19th century, cannot be without point to both physician and laic interested in the progress of medical and sociological thought.

Doctor C. Sobre-Casas, surgeon to the Rawson Hospital at Buenos Ayres, gives evidence in his recent work, *The Prophylaxis, Etiology and Treatment of Cancer*, (*Le Cancer. Prophylaxie, étiologie, traitement*. Paris: G. Steinheil) of the right sort of scientific spirit and the proper modicum of modesty which should characterize a work intended for medical thinkers. Unlike "The Conquest of Cancer" by C. W. Saleeby and "The Reduction of Cancer" by the Hon. Rolla Russell, the book under consideration is not blatant with theories especially prepared for a credulous public imbued with the idea, that the latest specific agent will be the means of effecting a cure and thereby demonstrate the uselessness of the knife. As Doctor Sobre-Casas says, "it is not my intention to elucidate the obscure problems contained in this chapter in pathology, nor shall I demonstrate the marvelous curative qualities of any specific agent, but merely condense what has already been written on the prophylaxis, etiology and treatment of malignant tumors." That the author is well equipped for his work is made clear to us by the fact that the Argentine Government appointed him in an official capacity to study the question of cancer, in the hospitals, clinics and laboratories in the different European countries, and to assimilate, if possible, the results of all researches made. The chapter relative to the organization of an anticancerous war, which at present obtains in various localities, indicates the industry and thoroughness of the writer in collecting data, and leaves nothing to be desired as regards the minutiae of a most interesting subject.

In connection with the masterly article by Prof. William Ebstein on the "Physiognomy of the Sick," recently published in the *Rundschau* (Frankfort-on-the-Main, Germany) and a translated excerpt of which

was printed in the "Obiter Dicta" of the INTERSTATE MEDICAL JOURNAL for February, it would be well for those who are interested in the subject, to read Dr. P. Hartenberg's "Physiognomy and Character" (*Physiognomie et caractère*, Paris: Félix Alcan, 1908). The author attempts to explain, scientifically, those physiognomic facts which have often been studied by savants in the past. As with most students of this engrossing subject, Dr. Hartenberg fails to arrive at definite conclusions, for the reason that physiognomic expression is the result of many and diverse influences, and to solve the intricate problems involved will require, for some time to come, a greater number of observations and more thorough analysis. Despite these drawbacks, the author accomplishes enough to warrant praise. And that he works on original lines is shown by the fact that, unlike his predecessors, he makes both physiological and psychological laws the foundation of his reasonings. Beginning by explaining the functional psycho-somatic relations and the centripetal action,—that is to say the influence of the organism on the brain,—and then the centrifugal action of the brain on the organism, he proceeds step by step, first analyzing individuals by studying them from the point of view of their anatomic constitutions, temperament, statics and dynamics, and finally noting the variations due to race, sex, age, profession, etc.

The new French journal, *Le Journal de Chirurgie*, (Paris: Masson et cie) is not only an excellent illustration of letter-press but has a contents of so high an order, that the editors B. Cunéo, A. Gosset, P. Lecène and others, are in no danger of receiving any but the kindest criticism. Monthly publications of the character of this new journal should find a warm welcome with all surgeons interested in the progress of their chosen specialty.

Dr. R. L. Thompson, Professor of Pathology at St. Louis University School of Medicine, has written a book of European travels that makes delightful reading on account of its originality. The book in question is "Glimpses of Medical Europe" (Philadelphia: J. B. Lippincott Company) and though it is meant to be a guide for students to whom European countries are as yet an unknown quantity, it is equally valuable to the many who have visited the places described by the author, for his judgment, wit and philosophy transform an otherwise dry theme into a fascinating picture, that surely must hold the reader who wishes to recall half-forgotten foreign scenes. Any new interpretation of a hackneyed subject should give us pause, but when the interpretation is as literary, witty and philosophical as is Dr. Thompson's, the pause should at once take on all the characteristics of enthusiasm and praise.

ORIGINAL ARTICLES.

SOME PRACTICAL ASPECTS OF THE PHYSIOLOGY OF THE CIRCULATION.*

By C. C. GUTHRIE, S. B., M. D., Ph. D., of St. Louis.
(FROM THE PHYSIOLOGICAL LABORATORY, WASHINGTON UNIVERSITY.)

TABLE OF CONTENTS:

INTRODUCTION.

Parag.

- 1 Statement of subjects.

PART I.

- 2 Nature of the problems.
- 3 Vital character of circulation.
- 4 Practical considerations.
- 5 Morphology.
- 6 Factors in arterial pressure.
- 7 Work of the heart and nervous control.
- 8 Peripheral resistance and nervous control.

DEMONSTRATION A.

Restoration of the Isolated Heart.

- 9 Application of physiological knowledge.
- 10 Perfusion of coronary arteries.
- 11 Employment of inert fluids (hydrogen gas, metallic mercury, and paraffine oil).
- 12 Employment of inorganic salt solutions.
- 13 Differences in gas and NaCl.

DEMONSTRATION B.

Stimulating Action of Sodium Chloride Solution.

- 14 Behavior of heart in salt solution and blood.
- 15 Colloidal fluids.
- 16 Nutritional fluids.
- 17 Classification of perfusion fluids.
- 18 Comparison of results with others.

DEMONSTRATION C.

Restoration of heart *in situ*. (Protocol I.)

- 19 Description.
- 20 Method. (1) Artificial respiration.
- 21 (2) Massage of heart.
- 22 (3) Perfusion of coronary arteries.
- 23 Instrument for perfusing the heart *in situ*.
- 24 Perfusion fluid and condition of its injection.
- 25 Importance of cerebral circulation.
- 26 Return of function of respiratory and vaso-motor centers.

*Address delivered before the St. Louis Medical Society, February 29, 1908.

DEMONSTRATION D.

Increased Peripheral Resistance on the Circulation.

(Protocol II.)

Parag.

- 27 Normal mechanism of peripheral resistance.
- 28 Aortic occlusion.
- 29 Decapitation and results.
- 30 Relation of increase of mass of blood to circulation.
- 31 Clinical transfusions of blood.
- 32 Practical application.
- 33 Error of coronary perfusion without aortic compression.
- 34 Drug action.

PART II.

A Consideration of Some Phenomena Observed After Alterations of the Circulation.

INTRODUCTION.

- 35 Methods.
- 36 Functional results.
- 37 Operation to increase lumen at point of anastomosis. Protocol III.

PHYSIOLOGICAL AND MORPHOLOGICAL RESULTS OF TRANSPLANTED BLOOD VESSELS.

- 38 Changes in blood vessels.
- 39 Factors to be considered.
 - (a) Alteration of functional circulation.
 - (b) Alteration of nutritional circulation.
 - (c) Abolition of nutritional circulation.
 - (d) Abolition of lymphatic circulation.
 - (e) Severance of nervous connections.
 - (f) Toxicity of host's body liquids.
- 40 Heterotransplantation.
- 41 Formaldehyde-fixed segment.
- 42 Fate of cells in transplanted segments.

RESULTS IN OTHER TISSUES AFTER ALTERATIONS OF THE CIRCULATION.

- 43 Alteration of circulation in lobe of normal thyroid gland.
- 44 Alteration of circulation in lobe of pathological thyroid gland.
- 45 Organ transplantation.
- 46 Replantation of thigh.
- 47 Conclusions.

INTRODUCTION.

1. The subject matter of this paper is divided into two parts as follows:

Part I. A consideration of some phenomena of the circulation with especial reference to mechanical conditions.

Part II. A consideration of some phenomena observed after alterations of the circulation by vascular anastomoses.

PART I.

2. In taking up Part I it may be well to state that the problems considered are of a simple nature. Furthermore we do not lay much claim

to originality in dealing with a subject that has been so largely dealt with by a multitude of investigators. For brevity, extensive reference to investigators, as well as many details, will be omitted.

3. In birds and mammals the circulation may be considered as one of the major vital phenomena, as cellular activity is so entirely dependent upon it. This is well illustrated in the case of fainting (syncope), the higher nerve cells being rendered incapable of properly functioning by anæmia, hence unconsciousness.

4. The practical considerations we have in mind deal ultimately with (a) the control of failing circulation in abnormal conditions, e. g. surgical shock, and (b) its restoration even after complete stoppage.

5. Morphologically, the circulatory apparatus consists of a central pump, the heart, connected with a system of elastic tubes, the blood vessels, divided into two sets as follows: (a) the arteries, which conduct the blood from; and (b) the veins which return it to the heart. These two systems of tubes communicate through the capillaries. The work of the heart is largely expended in overcoming the resistance offered to the flow of the blood through the arterioles and capillaries, so that the return of the blood through the veins is largely dependent upon other factors, e. g. aspiration of the thorax and general muscular contraction.

6. The pressure in the arterial system, under normal conditions, is largely dependent upon two factors: (1) the work of the heart; and (2) the peripheral resistance.¹ A third factor of interest in this connection is the mass of blood. This will be referred to later under Demonstration D.

7. (1) The work of the heart, i. e. the rate and force, is normally under nervous control.² The nerve impulses originate in the upper part of the spinal cord, the medulla oblongata. In the normal animal, if the arterial blood pressure be mechanically increased, as may be done by compressing the aorta, the working of the heart is automatically decreased, while if the pressure be lowered, as by releasing the aorta, the working of the heart is increased, the mean arterial pressure tending to remain constant. This control is normally exercised by the extrinsic cardiac nervous mechanism by virtue of impulses originating in the central nervous system. It is an interesting fact, recently discovered by Dr. Pike, of the University of Chicago, and myself, that after the extrinsic cardiac nerves are cut, viz. the vagi and accelerantes, and even in the heart removed completely from the body, there is strong evidence that such regulation of the rate and force of the beat to changes in arterial pressure is still preserved.³ Hence it appears that within the heart a mechanism exists, which, in the absence of any connection with the central nervous system, is capable of governing the working of that organ.

8. (2) We will now consider for a moment the mechanism of control of the peripheral resistance. It is well known that alteration in the peripheral resistance occurs under normal conditions chiefly through tonic changes in diameter of the arterioles. This is effected by nervous impulses that originate in the medulla oblongata and pass along nerve fibres to the muscular cells situated in the walls of the arterioles.⁴

After this very brief review, we may now take up the practical side of the question.

9. To the question, how may the possession of physiological knowledge be turned to practical use, a partial answer is to be found in the first demonstration.

DEMONSTRATION A.

Efficiency of Perfusion of the Coronary Arteries in Starting the Isolated Mammalian Heart.

(By Messrs. Quade and Tuholske of our third year class.)

10. The heart has been removed from the body and suspended from a cannula tied in the root of the aorta (see Fig. 1). It has ceased to beat.

Perfusion of the Coronary Artery in The Isolated Heart.

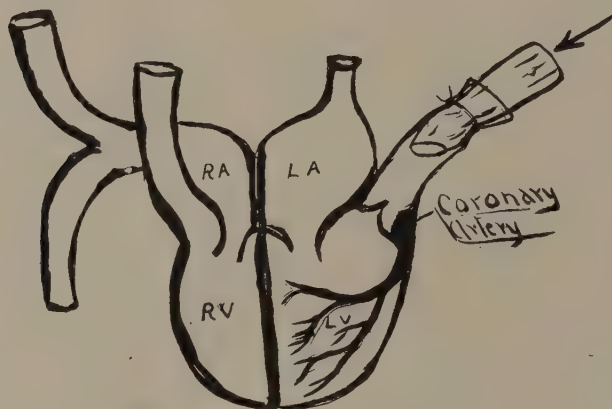


Fig. 1

Fig. 1. Showing cannula inserted into aorta for perfusing the coronary arteries in an isolated mammalian heart.

The animal's blood has been collected, defibrinated and mixed with three volumes of 0.9 per cent. NaCl solution. The mixture of blood and salt solution at a temperature of 35 degrees C. is injected through the cannula into the root of the aorta under a pressure of 160 mm. Hg. Thus perfusion of the coronary vessels is effected and the heart soon begins to beat strongly (see Fig. 2).

11. We are indebted to Langendorff, Martin, Porter and others,⁵ for the knowledge that perfusion of the coronary arteries will cause a quiescent heart to contract. The essential condition primarily involved appears to be a stimulating action associated with the pressure of the fluid in the capillaries of the heart. This is evidenced by the fact that inert fluids such as hydrogen gas,⁶ metallic mercury⁷ or paraffine

oil,⁸ are efficient in starting the beat in a quiescent heart providing of course that it has not been in that condition too long a time. But since such an inert fluid is unable to maintain nutrition, the heart soon becomes quiescent again.

12. Isotonic salt solutions have been extensively used for perfusing the heart. Chief among these may be mentioned sodium, calcium and potassium salts in the amounts they occur in the blood, as determined from the analysis of blood ash.⁹ These may be taken as representatives of the class of truly inorganic solutions.

13. The chief difference in the result with such salt solutions compared with the results obtained by perfusion with inert fluids, (gas, oil, mercury), is a quantitative one. The heart may beat more strongly and

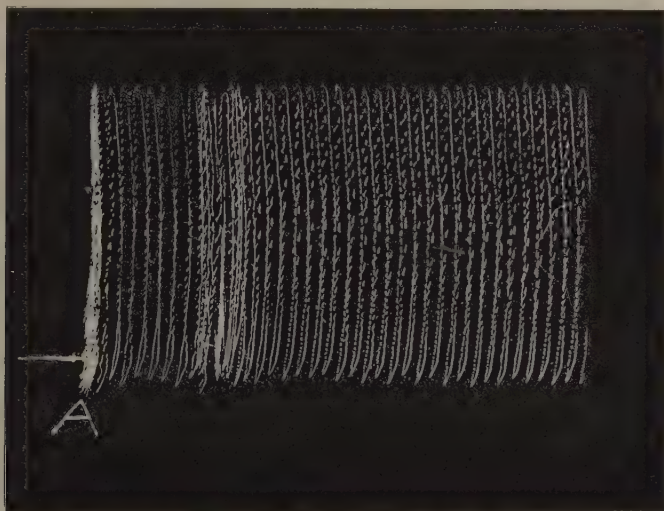


Fig. 2. Cardiogram showing contraction of isolated mammalian heart under perfusion. Injection begun at A, the drum being started after the heart had begun to contract.

for a longer time with a salt solution, but this may be largely explained: (1) by reason of its greater carrying capacity for the waste metabolic products of the heart tissues; (2) by its carrying a certain amount of oxygen in solution to the heart, and (3) the solution may have a stimulating action on the cells of the heart by reason of some specific quality of the salts as in the case of sodium or calcium,¹⁰ or by reason of lack of molecular concentration. Or it may exhibit a *pseudo* molecular concentration. By the latter term is meant that to physical measurements, e. g. determination of its molecular concentration by the freezing point method, the solution may be identical osmotically with the animal's own blood, but owing to the great difference in composition of the tissue liquids and the salt solution, other physical inequalities may exist.

It is interesting to note the difference in behavior of a quiescent heart placed in defibrinated blood and one placed in any of the inorganic salt solutions.

DEMONSTRATION B.

Showing Stimulating Action of So-called Isotonic Sodium Chloride Solution on the Heart.

(By Messrs. Ryan, Wier and Edler of our second year class.)

14. Similar strips of muscle from the ventricle of a turtle's heart have been prepared and attached to levers arranged to mark on a smoked

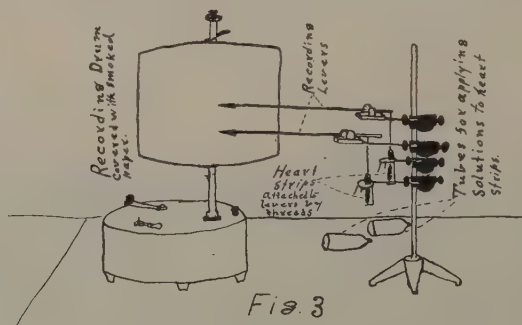


Fig. 3. Arrangement for recording the behavior of strips of turtle heart muscle.

paper (as shown in Fig. 3). Both strips are quiescent. On submerging one of the strips in 0.75 NaCl solution and the other in the animal's own blood which has been collected and defibrinated for that purpose, it is observed that the first mentioned strip soon begins to contract while the other strip remains quiescent¹¹ (see Fig. 4). On mechanical stimulation, the strip in blood contracts. (Fig. 5.) Also, if the blood be re-

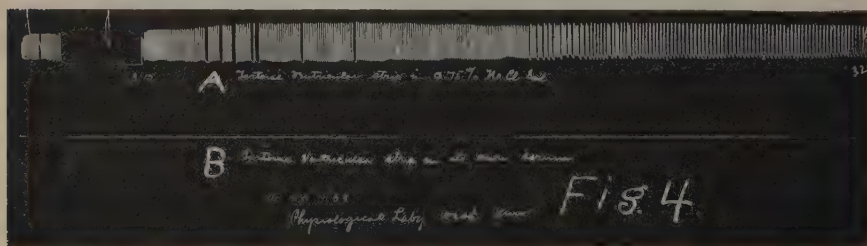


Fig. 4. A. Record of behavior of strip of heart muscle of turtle in 0.75 NaCl solution. B. Same in animal's own blood.

moved and replaced with salt solution, the strip begins to contract. This is very strong evidence that the latter class of solutions are not inert, but stimulating. They cannot be considered as nutritional, excepting for the small volume of oxygen they carry, which, even under a pressure of a full atmosphere of oxygen, is much less than the oxygen in highly venous blood. Therefore their action is to quickly exhaust the heart.¹² But the action does not stop there; the cells are caused to lose their vitality rapidly.¹³

The results of Christiani¹⁴ on the preservation of thin slices of tissues for grafting strongly corroborate this view. But this will be discussed later.

15. Another class of artificial perfusion fluids are prepared by the addition to inorganic salt solutions of substances calculated to render their physical characters more nearly the same as blood, e. g. the addition of gum arabic.¹⁵

16. Still a third class is prepared with the view of supplying food material to the tissues, e. g. Locke's solution,¹⁶ which differs essentially from the inorganic salt solutions, in that it contains a small amount of dextrose, which theoretically, will be oxidized. This has recently been independently demonstrated by Dr. McGuigan in our laboratory to be true for skeletal muscle,¹⁷ and by Dr. Locke, an English physiologist, for cardiac muscle.¹⁸

Another similar solution is prepared by the addition of serum proteid to the inorganic salt solutions,¹⁹ or from milk whey²⁰ so that the com-

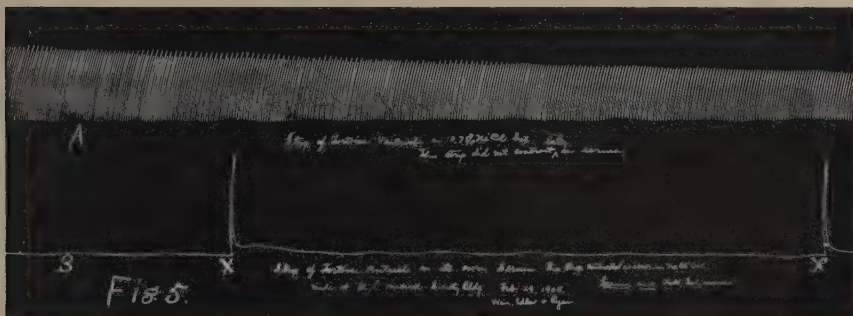


Fig. 5. Same as Fig. 4, only strip in blood was mechanically stimulated at X and X'.

position is more nearly like blood serum. It is generally accepted that any of the above solutions should be rendered slightly alkaline for the best results.²¹

Another class of solutions partaking of the characters of all those just described consists of solutions made by diluting the animal's own blood with one of the salt solutions.²²

17. We may arrange these solutions into two general groups as follows:

A. Non-nutritional, or those composed wholly of inorganic salts and water, and,

B. Nutritional, or those containing in addition to the substance found in the first group, organic substances found in the blood.

As judged by the results, we would put solutions containing blood in a class by themselves, while next would come the solutions most nearly approaching them in composition, e. g. whey solutions. Only such solutions are capable of initiating and maintaining for any considerable length of time *efficient* working of the mammalian heart.²³ By efficiency

of solutions in restoring the heart, is meant the production of rhythmical contractions of the whole heart of sufficient force and rate to maintain a circulation equal to that normally performed, and not merely as some investigators have used the term, notably Kuliabko²⁴ as the causation of *visible* contraction of isolated portions of the cardiac musculature.

18. Our results, then, although they have been obtained only after much shorter intervals after death of the animals, intervals of minutes²⁵ as against days, may, and we believe do have a practical value, while in cases such as above mentioned, the results are only directly of scientific interest.

What has been said may also be applied to the restoration of the heart *in situ*.

DEMONSTRATION C.

Efficiency of Perfusion of the Coronary Arteries of Starting the Heart *in situ* (see Protocol I).

(By Messrs. Seabold and Taylor of our third year class.)

19. The blood pressure tracing taken from the common carotid artery of the dog shows that the pressure has fallen to zero. (Fig. 6 A 5.) Also that the heart has ceased to beat as indicated by the cardio-

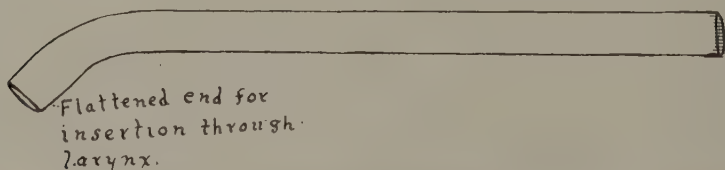


Fig. 7. Tube for passing into trachea through larynx in giving forced artificial respiration to dogs and cats with bellows or compressed air.

graph. (Fig. 6 B 5.) It must be remembered that as a rule the heart continues to beat for some time after its force has ceased to be communicated to the manometer. (Compare Figs. 6 A and B (4) to (5.) This condition has in some cases been observed to extend over a period of hours, but usually it is of only a few minutes duration. The thorax being open in this case, we are enabled to inspect the heart directly and we are unable to detect any contraction whatsoever of any part of the organ. Since it is well known that resuscitation is much easier of accomplishment if begun while the heart is yet contracting, even though feebly, we have a more difficult problem in such a case as this.

20. Our method consists of the following procedures:

(1) *Artificial respiration.* This is mainly for the purpose of oxygenating the blood in the pulmonary capillaries. In this case we are giving it directly with a bellows connected with a tube inserted into the trachea. In the intact animal, it may be given similarly by means of a tube passed into the trachea through the larynx, (Fig. 7) or by any of the well known methods of thoracic manipulation such as Sylvester's or Schafer's.²⁶

21. (2) *Massage of the heart.* This is chiefly for the purpose of establishing a pulmonary circulation before the heart has sufficiently recovered. This is very important as it not only tends to relieve the tension in the right heart and great veins due to congestion, which may seriously interfere with the recovery of the heart, but also supplies oxygenated blood in the root of the aorta for admixture with the fluid used for perfusing the coronary vessels.

In this case the heart is being directly massaged, but in the intact animal, in case of cats and dogs, this may be adequately performed by manipulation of the chest wall. In large animals with rigid thoracic walls it is sometimes advantageous to make an opening into the abdominal cavity and, by inserting the hand, manipulate the heart through the diaphragm.

22. (3) *Perfusion of the coronary arteries.* This is accomplished by introducing one of the fluids previously discussed, as 0.9 NaCl, into the root of the aorta under sufficient pressure to force it together with

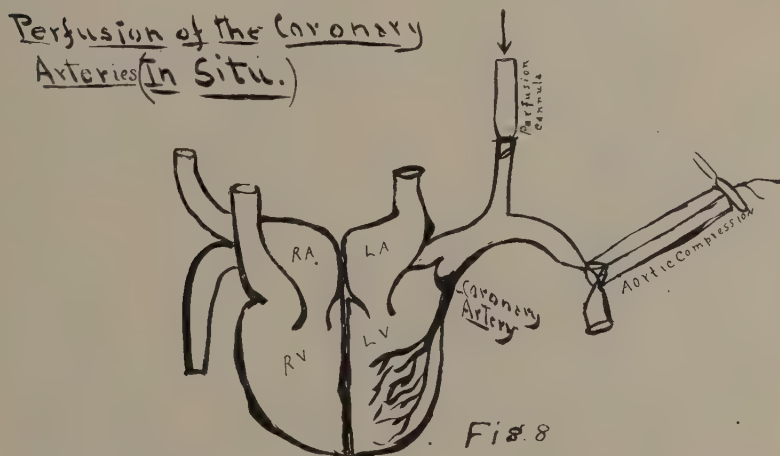


Fig. 8. Showing method of perfusing the coronary arteries of the heart *in situ*.

the blood massaged into the aorta through the coronary arteries. (Fig. 8). In this instance we have occluded the aorta just distal to the left subclavian artery by a temporary ligature. (Fig. 9.)

23. In resuscitating animals with the view of getting complete recovery, we use an instrument (Fig. 10) consisting of two tubes, one of which runs inside of the other. The smaller tube is connected externally with a syringe while internally it opens beneath a sleeve of thin rubber fitted around the larger tube near the end and tied tightly above and below around its edges. Liquid forced out of the syringe is delivered by the small tube between the rubber sleeve and the large tube with the result that the sleeve is expanded in the form of a bulb. Before inflating the rubber sleeve, the instrument is pushed down one of the carotid arteries, preferably the left, and the lower end carrying the sleeve directed

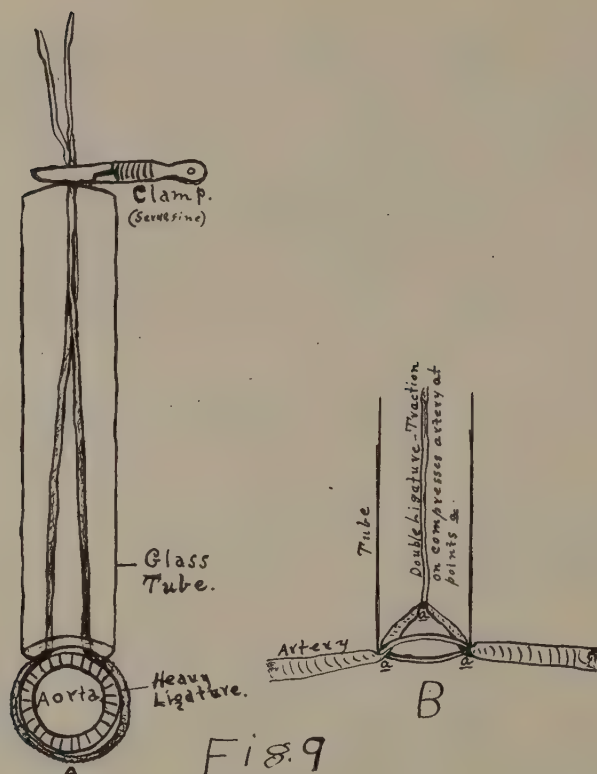


Fig. 9. Method of compressing blood vessels. A. Ligature loosely applied. B. Diagram of effect of traction on ligature.

into the arch of the aorta towards the heart. The external end of the large tube is then connected with a pressure bottle containing the perfusion solution, and the rubber sleeve inflated by means of the syringe

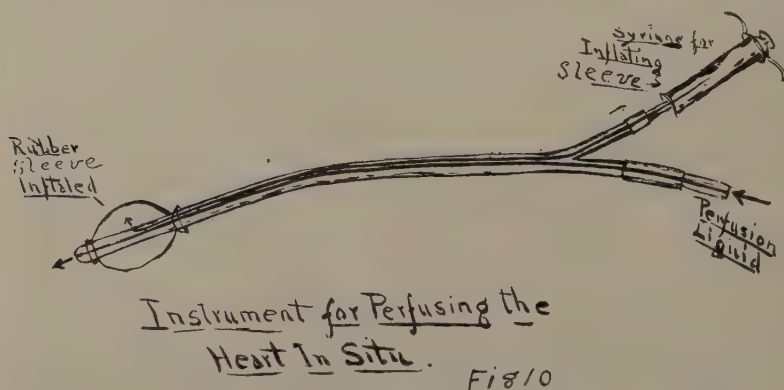


Fig. 10. Instrument for perfusion of the mammalian heart in situ.

until the aorta is occluded. The perfusion liquid when turned on will then escape through the open end of the large tube beyond the point of the aortic occlusion and the pressure in the root of the aorta will be raised thereby, resulting in a circulation of the liquid through the coronary arteries.

24. The solution we are injecting into the central end of the common carotid artery is 0.9 per cent. NaCl, at approximately body temperature, and under a pressure of 160 mm. Hg. which is probably not much higher than the normal arterial pressure in such an animal. (See foot note, p. 502.) As before stated, the solution is being mixed with oxygenated blood forced into the root of the aorta by massage of the heart, so that in reality we are perfusing the coronary arteries with dilute arterial blood, which next to whole blood, would seem to be as far as is known, the best possible fluid for this purpose.

25. At the same time the brain and upper part of the spinal cord are being perfused, as some of the arteries supplying these parts are not shut off. This is of extreme importance as the cells of the central nervous system are much more susceptible to, and are more readily killed by anæmia than the cells composing most of the other tissues of the body.²⁷ This is well illustrated by the results obtained with Professor Stewart.²⁸ We found that it was possible to resuscitate cats after as much as 60 minutes of complete anæmia of the upper central nervous system; but after periods of more than 20 minutes, power of permanent return of normal function was apparently lost.

26. As the heart begins to beat efficiently, (Figs. 6A and B) we gradually discontinue the cardiac massage and the injection of the solution. Next the aorta is partially released so that the channel of arterial circulation is widened. As a rule, complete release of the aorta must be delayed until evidence of return of vaso-motor function is observed as the heart may cease to beat from lack of pressure, due to too little peripheral resistance. Return of function of the respiratory and vaso-motor centers ordinarily occurs at about the same time, so that the respiratory movements give us a good index on the state of the vaso-motor center. Artificial respiration should be continued until the automatic respiratory movements become strong and regular. At this time also it is safe to release the aorta completely. (Figs. 6A and B (7); also see Figs. 11A and B (1 to 4).

PROTOCOL I.

Restoration of the Heart *in situ*.

March 6, 1908. Young bitch, weight 6k.

4:18

Etherized dog. Inserted tube in trachea for artificial respiration. Tied a cannula in each of the common carotid arteries. Cut away anterior wall of thorax, exposing heart. Adjusted cardiograph and connected manometer with cannula in left common carotid artery for blood pressure. Smoked drums were used for recording movements of the heart and blood pressure. Speed of the former was slightly greater than that of the latter. The blood pressure tracings, as indicated in Figs. (6, 11, 12 and 13), are labeled A, while the cardiographic

- tracings are labeled B. In referring to the figures, the numerals indicating points on tracings are written in brackets.
- 4:55 Started drums (1).
- 4:58 Began asphyxiation by stopping artificial respiration (2).
- 5:03 Last gasp (4).
- 5:07:30 Note that oscillation of mercury ceased between (3) to (4) on blood pressure tracing, and that contractions of the heart were recorded by the cardiograph to (5). At this point drums were stopped.
- 5:09 Began artificial respiration, cardiac massage, started injection of 0.9 NaCl into right common carotid artery and occluded thoracic aorta by ligature previously placed (blood pressure tracing, Fig. 6A (5a)).
- 5:14 Massage and injection discontinued (6). Cardiograph adjusted.

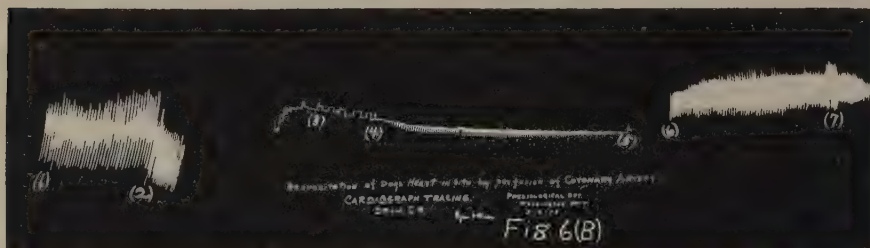
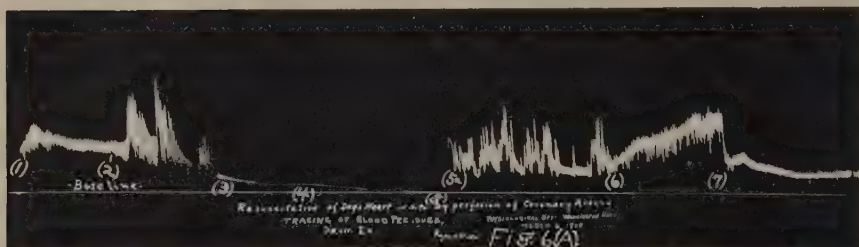


Fig. 6 (A) and 6 (B). Resuscitation of the mammalian heart. A. Blood pressure tracing. B. Cardiogram.

- 5:17 Released aorta (7). Note accompanying sudden great fall of blood pressure. For efficiency of recovery, compare 11A and B (1) to (2) (blood pressure 90 mm. Hg.) with 6A and B (1) to (2) (blood pressure 60 mm. Hg.).

SUMMARY.

Normal blood pressure 60 mm. Hg.
 Period of asphyxiation 11 minutes.
 Time for complete resuscitation of heart 6 minutes.
 Blood pressure 30 minutes from time of beginning of resuscitation 90 mm. Hg. (or 50 per cent more than before asphyxiation).
 Respiratory and voluntary movements, cornea reflex, etc., were thoroughly re-established before this time.

DEMONSTRATION D.

Influence of Occlusion of the Aorta on the Circulation (See Protocol II).

(By Messrs. Barrow and Sewing of our third year class.)

27. The arterioles are normally maintained in a state of tonic contraction, as before stated, by impulses that originate in the upper part of the spinal cord and pass to the muscular fibres situated in their walls over nerves known as the vaso-motors. Owing to this contraction of the muscle fibres, the lumen of the vessels are narrowed and thus increased resistance is offered to the passage of the blood into the capillaries. The arteries, therefore, are unable to empty themselves by their elastic contraction between the beats of the heart and the arterial blood pressure is maintained. In this animal, in which this mechanism is intact, the mean blood pressure as indicated by the manometer connected with one of the common carotid arteries, is about 90 mm. Hg. (Fig. 11A (1) to (4)).

28. A ligature has been placed around the thoracic aorta and the two ends passed through a glass tube of convenient length and secured. By traction upon the free ends of the ligature, the aorta is compressed against the end of the tube. Thus it may be occluded at will. (Fig. 9.)

29. The tissues of the neck are ligatured and divided. Variations in blood pressure may be observed, due to the tying off of the blood vessels and stimulation and division of the nerves. (Fig. 11A (4-5).) Immediately after division of the spinal cord and complete decapitation, there is a marked lowering of the blood pressure (Fig. 11A (6)) and disappearance of respiratory movements. Artificial respiration is now begun and the aorta is occluded by traction on the ligature previously placed. (Fig. 11A (6a)). There is a sudden and great increase in blood pressure due to the occlusion. On releasing the aorta, there is a corresponding fall. (See Fig. 6A (7)). By adequate occlusion of the aorta, the blood pressure may be maintained for hours.

PROTOCOL II.

Maintenance of the Circulation after Decapitation.

March 6, 1908. Animal employed for resuscitation (Protocol I) was the one utilized in this experiment. Arrangement of apparatus same as in Protocol I, only drums were adjusted for *same* speed.

5:39 Started drums (1) to (2) slow speed; (2) to (3) fast speed; (3) to (4) slow speed.

5:41 Began ligating all tissues of neck (4).

5:44 Sawed head completely off (5) to (6). Cardiographic tracing discontinued at (5). Occluded thoracic aorta (6a) and (6a') and (6a'').

Release of aorta is indicated by (6b) and (6b').

Injected NaCl solution.

5:55 Drums on fast speed (7) to (8).

5:57 Drums removed (9).

6:09 Intrathoracic temperature 31 degrees C.

6:10 Started drum (1). Drums on fast speed (2) to (3). Injected more NaCl solution and released aorta (4).

Compressed aorta (5).

Released aorta and injected NaCl solution (6).

Stopped injection (8).

Clamped aorta (9).

Injected NaCl solution (10).
 Stopped injection (11).
 (Total solution injected in whole experiment less than 1 L.
 Considerable blood was lost from the intercostal arteries as these
 vessels were not ligated before removal of thoracic wall.)

Note: This shows greater efficiency of injection with aortic compression than without. Also note the great difference in maximum and minimum and mean blood pressure with and without aortic compression, being far greater in the former. The great pulsatory oscillation (maximum and minimum pressure) is probably due: (1) to vaso dilatation; (2) relative inelasticity of the vessels; and (3) small capacity of arteries to which the circulation is restricted.

Drums on fast speed (12) to (13).
 Animal's hind-quarters elevated (14) to (15).
 Stopped drums (16).
 6:27 Started drum (1).
 6:35 Drum on high speed (2) to (3).
 Compressed abdomen (4).

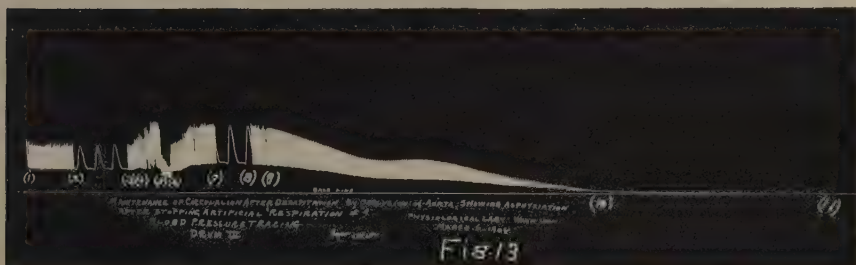


Fig. 13. Effect of asphyxia on blood pressure after decapitation.
 Blood Pressure Tracing Showing Effect of Asphyxiation After
 Decapitation.

Released aorta (5).
 Clamped aorta (6).
 Drum on high speed (7) to (8).
 6:38:30 Discontinued artificial respiration (9).
 6:46 Oscillation of mercury ceased (10).
 7:01 Last visible heart beat.

Note: The increased heart action after occlusion following temporary release of aorta. This may be explained (1) stimulating action on heart of increased pressure in coronary circulation; (2) increase in percentage of blood in circulating medium. It should be remembered a considerable amount of NaCl solution has been injected into this animal, and since the aorta has been occluded most of the time, thorough admixture with blood may not have occurred in the vessels below the point of occlusion. Therefore, when the aorta is temporarily released, some of this blood in the great veins is forced into the active circulation, thus serving to increase the blood content of the circulating liquid. Again, it is conceivable that since the blood in the restricted circulation is not permitted to pass through the abdominal viscera, waste products may accumulate and available food products be removed, so that when the blood from the great veins is caused to enter the active circulation, these conditions may in part be remedied. Other considerations might be brought forward, but since experimental evidence is lacking, further speculation is not profitable.

Attention is called to the rise in pressure and increased heart action following the preliminary fall after cessation of artificial respiration in the decapitated animal, which is shown in Figure 13 between (9) and (10). Whether or not a vaso-motor action is concerned in this phenomenon is not yet determined.

SUMMARY.

The mean blood pressure before decapitation was approximately... 90 mm. Hg.
 The maximum blood pressure before decapitation was approximately 100 mm. Hg.
 The minimum blood pressure before decapitation was approximately 80 mm. Hg.
 After decapitation, with the aorta occluded:
 Approximate mean blood pressure..... 85 mm. Hg.
 Approximate maximum blood pressure..... 135 mm. Hg.
 Approximate minimum blood pressure..... 35 mm. Hg.
 During periods when aorta was released:
 Approximate mean blood pressure..... 17 mm. Hg.
 Approximate maximum blood pressure..... 20 mm. Hg.
 Approximate minimum blood pressure..... 14 mm. Hg.
 After decapitation the circulation was maintained for 54 minutes and 30 seconds, at which time artificial respiration was discontinued and the experiment closed.

30. After decapitation, vaso-motor tone is lost and ordinarily, even though artificial respiration be given, the blood pressure rapidly sinks to zero. By occluding the aorta, not only may the peripheral resistance be raised to normal or higher, but by restricting the vascular area, the ratio of the mass of blood in the body to the capacity of the vascular system actively concerned, may be increased. Therefore, a better return of blood to the right heart is secured.

31. In this connection it is interesting to consider the mechanism of the results observed on the circulation in the transfusion of blood, a procedure recently revived by Dr. Crile, of Cleveland, Ohio, and which is occasionally employed clinically. In patients receiving a transfusion while their vaso-motor center is intact, as after hemorrhage, improvement in the circulation may be largely due to the increase in the mass of blood in the vessels. By sufficiently increasing the mass of blood above the normal, it is possible to destroy the vaso-motor centers, and yet have the circulation continue for a considerable time. This may be explained by a greater output of the heart compensating for the vaso-dilatation. Under this condition the pressure gradually falls. This, it would seem, may be in part due to a gradual increase in the capacity of the blood vessels after the sudden increase immediately following destruction of the vaso-motor center; and to escape of liquid from the blood vessels. The latter may occur through the kidneys, or directly through the walls of the blood vessels, as it is known that both foreign blood as well as vascular dilatation favor these processes. If more blood be transfused, the pressure may be restored to near its former level.

32. The practical application of influencing the blood pressure by mechanically increasing peripheral resistance is no doubt so well known to you that it would be unprofitable to go into the details of its application, such as compression of arteries, including the aorta, bandaging, etc. Possibly in certain classes of cases it might be more generally employed to advantage, e. g. in those where rapid increase in the peripheral re-

sistance of the arteries is indicated. But we trespass, as it is in the province of the surgeon and physician to make such applications.

33. Before leaving this subject, your attention is called to the error of attempting to efficiently perfuse the coronary arteries by injecting into the carotid without the occlusion of the aorta. For efficient coronary perfusion, it is necessary to get a pressure in the root of the aorta approaching normal blood pressure. To do this by the procedure just mentioned, it would be necessary to inject the liquid at a very high pressure as it readily escapes through the dilated arterioles into the capillaries and thus into the veins, leading to increased venous engorgement. To efficiently start a quiescent heart by this method would require such a volume of liquid that, to say the least, even if the heart could be started, serious embarrassment of the circulation would result. The injection of some powerful vaso-constricting drug along with the solution under these conditions would of course tend to increase the peripheral resistance and thus hinder the escape of so great a volume of the perfusion liquid into the veins. But, in principle, it is a much less simple method than the one just demonstrated.

34. We have endeavored to present to you only the relation of certain physical conditions to the circulation and, for lack of time, we refrain from going into the very interesting subject of the employment of drugs in restoring and controlling the circulation.

We might add, however, that as long ago as the autumn of 1902, we employed intra-arterial injection of adrenalin for these purposes but the known ill results of its injection were such as to discourage its use for permanent resuscitations. We have investigations under way in the endeavor to discover a reliable and efficient drug to use in such cases, but for the present we prefer not to state the results, since they are as yet incomplete and, therefore, inconclusive.

PART II.

A Consideration of Some Phenomena Observed After Alterations of the Circulation.

Introduction.

In taking up this part of the subject, we shall not go into the history of suture of the blood vessels farther than to say, that until 1905, when Carrél and myself perfected a successful method, no method had been reported that gave anything like constant good results.

Carrél has been endeavoring to unite blood vessels for several years with indifferent success, both in France and in this country.

Almost from the beginning of our work together, we got a very high percentage of successful results, and since we have been working independently, the same is true. Our work together was done in the Physiological Laboratory of the University of Chicago.

Method.

35. Since successful vascular anastomosis depends largely on the use of needles and thread of size in accordance with the vessels, very little need be said. We have here some of the needles and thread used in the

work. The needles are No. 16 cambrics and the threads are single strands of Chinese twist silk, the thread of which is made up of six such strands. Any long fibred thread will answer, provided it is fine enough and sufficiently strong. The needles and threads are sterilized in paraffine oil which I find much superior to vaseline, which we formerly used. No doubt any relatively inert oily substance would do as well, as far as the results are concerned. The blood vessels are handled with sufficient care to avoid injury to their walls, especially the intimas. Excess of blood is removed from the lumen of the vessels between the cut ends and the point of temporary hemostasis by sponging or washing with 0.9 NaCl solution. The former method is quite efficient and convenient. Hæmostasis on medium sized vessels is conveniently accomplished by means of ordinary serrefines (bull dog forceps). The vessels are protected from excessive drying by applying paraffine oil. This does not appear to be entirely without action on the tissues, but since uniformly good results have attended its use, and as it is very nice to use and keeps in-

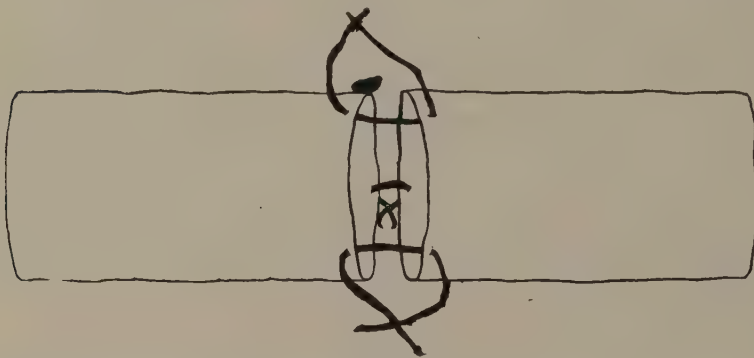


Fig 14

Fig. 14. Showing fixation of ends of divided blood vessels preliminary to suturing.

definitely, we see no reason for trying anything else for the purpose at present.

The actual mechanical suturing is simply the old and well known method of suturing divided tubular structures together, by placing three fixing ligatures at equi-distant points on the circumferential margin of the cut ends, (Fig. 14) each ligature being passed through corresponding points on both vessels, thus rendering approximation of the two ends simply a matter of tension on the ligatures. (Fig. 15) The ligatures are commonly tied and then the marginal intervals between the three are sewed together by continuous stitches. (Fig. 15) The aim is to get good approximation of the endothelial surfaces, and if each stitch be made to pierce each intima, this is readily accomplished.

The threads are impregnated with oil or vaseline before use, partly with the view of decreasing the chance of thrombosis, but mainly in order that their manipulation will be facilitated, and "sawing" of the

walls of the vessels which may occur with untreated threads, be avoided. Also, with the untreated thread there is danger of the outer loose adventitial tissue adhering to the thread and being drawn into the lumen of the vessel. This danger is largely obviated with the oiled threads. We may look upon the use of threads impregnated or coated with some oily substance mainly as permitting the use of larger threads than would otherwise be advisable.

36. As a rule the circulation in end to end anastomosis (Fig. 16) is excellent. But even with skilled technique, small thrombi may be laid down at points on the line of union of the intimas, presumably due to slight unevenness between their edges. Unless there be a gross fault in the technique, these small thrombi, which probably consist largely of

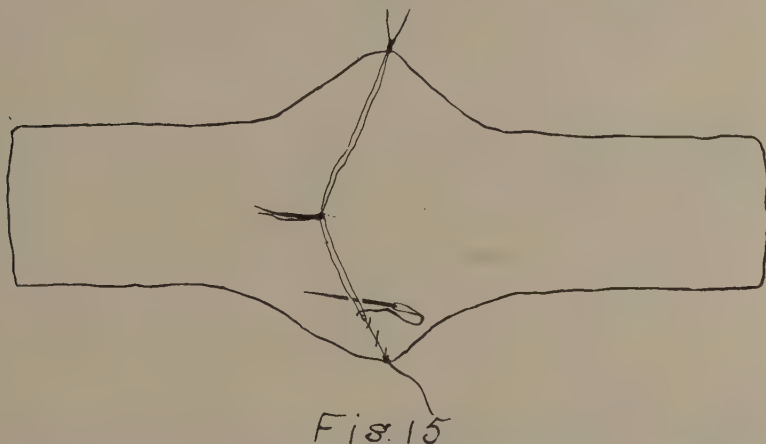


Fig. 15. Showing method of approximating edges and suturing divided blood vessels.

blood plates (personally suggested by Dr. Kemp) are limited to relatively small masses, so that in large or medium vessels they do not hinder the circulation to any considerable extent. But in relatively small vessels, their presence may be sufficient to seriously hinder or even stop the circulation.

37. To obviate at least in part this difficulty, the following operation devised to increase the area of the cross section of the vessels at the line of anastomoses (Fig. 17) and described in the accompanying protocol, is proposed:

Protocol III.

May 29, 1907.

Both common carotid arteries of a dog were cleanly dissected, doubly ligated and cut. The left was cut nearer the head than the right. The central end of the left and the peripheral end of the right were then crossed over the median line of the neck so that the ends lapped by about 2.5 cm. During the operation, the vessels were held in place by traction on the free ends of the ligatures which had previously been placed upon

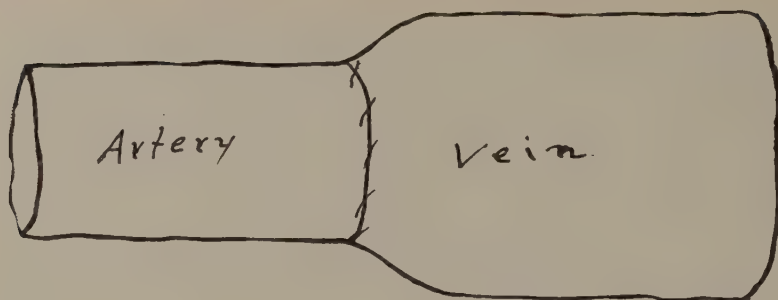


Fig. 16

Fig. 16. End to end arterio-venous anastomosis.

the vessels. A free end of each ligature on the ends of the vessels were threaded into needles and carried through the underlying tissues and thus brought out and tied to the corresponding free end. This served to anchor the vessels in place and to relieve the anastomosis in a large measure of the longitudinal strain. With curved scissors, an elliptical area was removed from each artery about 1.5 cm. from the end so that the resulting openings faced and approximated each other. Four corresponding points on the circumference of each opening were then fixed by as many ligatures after which the edges around their entire circumferences were stitched together. The wound was then closed. The animal made an uneventful recovery.

December 19, 1907, etherized dog. Examined vessels at point of anastomosis. The circulation was excellent.

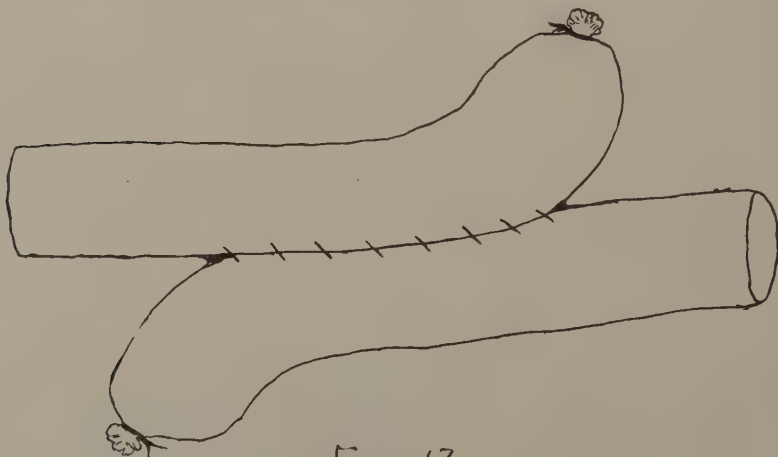


Fig. 17

Fig. 17. Termino-lateral anastomosis of blood vessels.

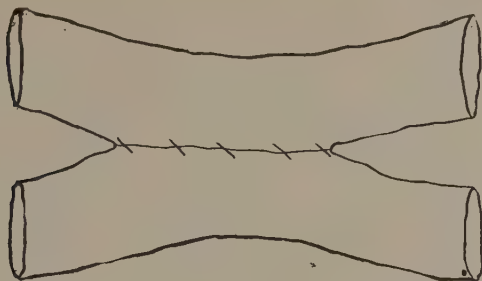


Fig. 18. Latero-lateral anastomosis, (as in Eck's fistula).

Upon removing the specimen and opening it by a longitudinal incision, the lumen was found to be entirely free of obstruction and the intima continuous and smooth.

From this it will be seen that, in itself, the operation is successful. Experiments on relatively small vessels are now being made. By using this technique, it would seem, for reasons already stated, that small vessels may thus be more successfully anastomosed than by the direct end to end method. Also successful anastomoses may perhaps be more easily accomplished on medium sized arteries, by the laboratory investigator of average skill, by this method than the ones used hitherto. In no

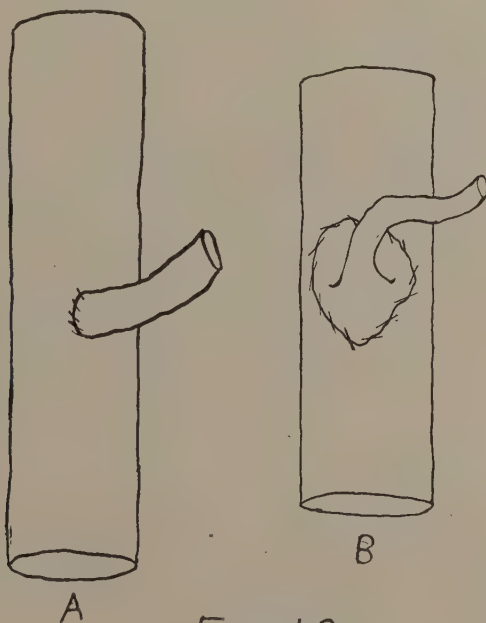


Fig. 19

Fig. 19. Termino-lateral implantation of blood vessels. A. Direct. B. By "patching," i. e. by removing an area of the "parent" blood vessel surrounding its mouth.

sense, however, is it intended to supersede direct end to end anastomosis when the latter is practicable; since end to end anastomosis on medium sized vessels is, for the practiced operator, somewhat simpler and more rapid and gives excellent permanent results.

Physiological and Morphological Results of Transplanted Blood Vessels.

38. When blood vessels, e. g. the carotid arteries, are anastomosed end to end *in situ* no change is observed in the histological structure of the walls.²⁹ If the central end of an artery, e. g. the common carotid be anastomosed to the peripheral end of a vein, e. g. the external jugular, the result is usually some alteration in the structure of both artery and vein, evidenced in the former by a decrease, and in the latter, by an increase in the thickness of the wall.³⁰ Dog No. 1, in which this operation was performed more than thirty months ago, exhibits active reversed circulation in the external jugular vein.

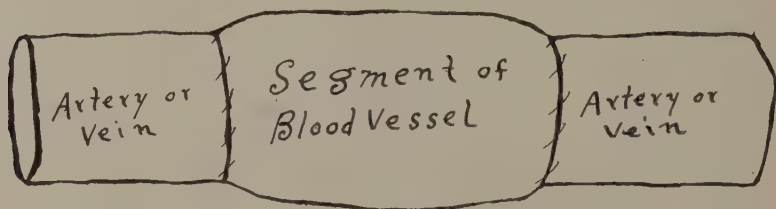


Fig. 20. Interposition of a segment of a blood vessel between the cut ends of another.

In rapid transplantation of segments of blood vessels (Fig. 20), in animals of the same species with only a short interval of anemia of the segment,³¹ as well as in heterotransplantations,³² marked histological changes occur as a rule in the segments consisting of a widening of the lumen and a thickening of the wall.³³ Dog No. 2, in which a segment of cat's abdominal aorta was interposed and sutured to the ends of the right common carotid artery, shows a good circulation through the segment after almost one year. The segment has become enlarged and thickened.

39. Even in the simpler operation of end to end anastomosis of artery on to vein, two important factors must be considered in accounting for these changes, namely, (a), alteration of the functional circulation consisting of a change of pressure in the lumen of the vessel; and, (b), alteration of the circulation in the nutritional capillaries, i. e. in the *vaso-vasorum*.

In the case of rapid transplantation of a segment of blood vessel in the same animal, in addition to the above, three more conditions must be considered, viz. (c) complete abolition of the circulation in the nutritional capillaries; (d) complete abolition of the lymphatic circulation; and (e) complete severance of nervous connections; while in the case of iso- or hetero-transplantations, still another factor must be added, (f) in the former the possible, and in the latter the probable toxicity of the host's body liquids for the segment.

40. The transplantation of a segment of rabbit's aorta between the cut ends of a dog's common carotid artery may be taken as an illustration of the magnitude of the histological changes that may occur and yet the mechanical function of conveying blood remain adequate. Three weeks after the operation direct examination showed considerable enlargement and thickening of the segment.³⁴ After eight months the enlargement both in diameter and length was much greater and also the thickness of the wall, yet the mechanical functioning was good. The gross arterial appearance of the segment was vastly changed, the walls being greatly hardened and transparent. The intima was perfectly smooth and glistening. On section the increased thickening of the wall was found to be in a large part due to an increase in the fibrous tissue. Here, then, we have excellent preservation of mechanical function, notwithstanding very great alteration in physical and histological structure. Similar results are being observed in a dog into which a segment of cat's abdominal aorta was transplanted, more than ten months ago.³⁵

41. In another case a segment of dog's abdominal vena cava preserved in 2.5 per cent. formalin (in 0.9 per cent. NaCl) for 60 days was used. The day before the operation, the segment which was about 0.75 cm. long and 0.5 cm. in diameter, was removed from the formalin solution, washed in dilute ammonia, dehydrated in absolute alcohol and impregnated with paraffine oil. It was interposed between and sutured to the cut ends of the right common carotid artery of a medium sized bitch. (Dog No. 3.) The diameter of the artery was considerably less than that of the venous segment.³⁶

The animal made a rapid and uneventful recovery, the wound healing promptly. Clinical examination 22 days after the operation revealed a strong pulsation on the course of the artery at the site of the transplanted segment. The following day, the neck was opened and the vessel directly examined. The segment was found to be about 1.5 cm. long and .75 cm. in diameter. It pulsated strongly and the circulation through it was excellent. The walls appeared to be slightly thickened but pliable. In appearance it resembled similar segments previously transplanted immediately after removal. The wound was closed and the animal returned to its cage. On the 37th day after the operation, clinical examination gave the same results as on the 22nd day. No extensive histological studies have as yet been made, but material is being accumulated for that purpose.

42. The question naturally arises, therefore, do the cells of the segments of blood vessels actually survive, and by their growth and multiplication, account for the histological changes observed, or do they to a greater or lesser extent perish and only preserve the mechanical function of the segment and serve as a bridge for the ingrowth of other cells after which they suffer degenerative and absorptive changes?

The work of Eiselberg,³⁷ Christiani,³⁸ and others would lead us to conclude *a priori* that even when replaced in the same animal from which it was removed, only a thin layer of the outer cells in such a transplanted segment of blood vessel could survive. As to the intima, I know of no results obtained under exactly comparable conditions, that

is, transplantation of similar tissues into blood vessels. The results of Busch and Van Bergen³⁹ on survival of cells of the suprarenal tissues transplanted into the spleen might possibly be quoted in favor of survival of the intimal cells.

But in the case of the transplanted formaldehyde-fixed segment it is hardly conceivable that any of the cells could have survived. Yet after a considerable interval it performs the mechanical function required of it and macroscopically differs not greatly from what would be expected of a fresh segment transplanted in similar fashion.

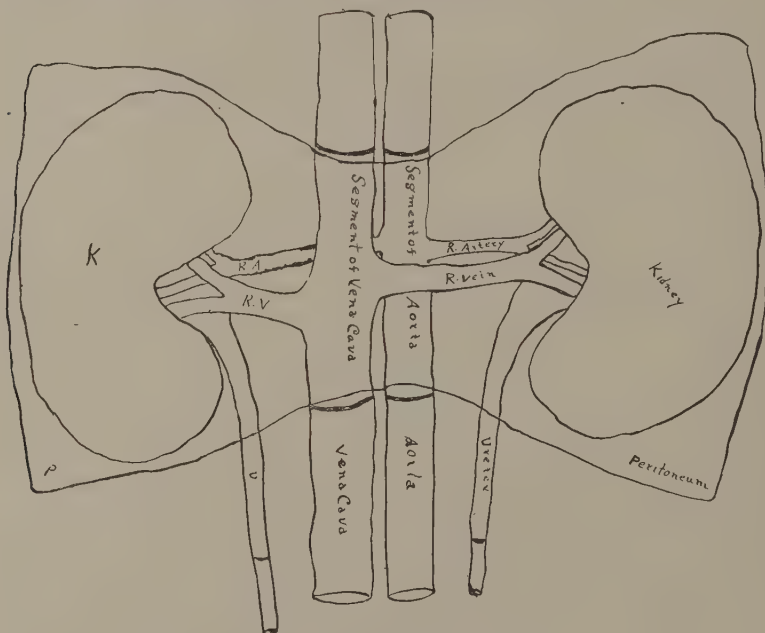


Fig. 21

Fig. 21. Showing method of transplanting in mass.

The problem is one of great complexity and until a very material addition to the present data is made, conclusions and generalizations should be held in abeyance, or if uttered, disregarded.

Results in Other Tissues After Alterations in the Circulation.

43. The results observed after alteration of the circulation to parts may be illustrated by reversal of the circulation in the thyroid gland. Dog No. 4 had the right thyroid lobe removed and replanted with reversal of the circulation August, 1905.

No symptoms attributable to the operation, except a temporary swelling of the lobe operated upon, have been observed. Now, to clinical examination, the operated gland appears to be somewhat smaller than the unoperated.

In the case of reversal of the circulation in goitre in dogs, or by

reversing the circulation in one of the thyroid veins, very marked results have been observed.

44. In dog No. 5 the right inferior thyroid vein and corresponding carotid artery were divided and the central end of the artery sutured to the peripheral end of the latter, thus causing a reversed circulation of arterial blood in the vein. At the time of the operation the animal presented a bilaterally symmetrical goitre. Now the lobe on the unoperated side appears unaltered, but on the operated side there has been a very decided decrease in size.

Histological specimens from similar cases show a relatively dense structure and larger proportion of colloid material on the operated side compared to the unoperated.

45. By utilizing the "parent" blood vessels (see Fig. 21) a procedure first proposed to, and carried out with Carrel, the study of transplanted organs whose blood vessels are of such small size, or of anatomical arrangement as to render their direct anastomosis difficult, or even impossible with our present technique is rendered possible. The kidneys of a cat are a good example. (Fig. 21.) By utilizing the aorta and vena cava, good circulation through the kidneys has been obtained by us,⁴⁰ while direct anastomosis of the renal vessels on cats has not given satisfactory results. On larger animals no doubt direct anastomosis of the renal vessels may easily be made.

46. Results of removal and replantation of the thigh⁴¹ are very interesting, but lack of time forbids their presentation.

47. As yet we are not in possession of enough results to warrant the drawing of conclusions as to the ultimate value of such alterations of the circulation or of organ transplantations to surgery.

In closing I desire to express my thanks to the President and other officers of this Society for their courtesies; to the audience for their presence and attention, and to my assistants and students for their co-operation.

BIBLIOGRAPHY.

1. Stewart: Manual of Physiology, 1906, p. 93.
2. Porter: American Text-book of Physiology, 1903, I, pp. 148-78.
3. Guthrie and Pike: Science, N. S., 1906, XXIV, pp. 52-54.
- Guthrie and Pike: American Journal of Physiology, 1907, XVIII, pp. 14-38.
- Guthrie and Pike: Biophysicalisches Centralblatt, 1906, II, p. 151.
4. Kirkes' Handbook of Physiology (revised by Greene), 1907, p. 214.
5. Langendorff: Ergebnisse der Physiologie, 1905, II, p. 764.
- For literature the reader is referred to
- Magrath and Kennedy: Journal of Experimental Medicine, 1897, II, p. 13.
6. Magnus: Archiv für experimentelle Pathologie und Pharmakologie, 1902, XLVII, p. 200.
7. Sollmann: American Journal of Physiology, 1906, XV, p. 122.
8. Loc. cit. pp. 121, 126; also,
Guthrie and Pike: American Journal of Physiology, XVIII, p. 21, 1907.
9. Merunowicz: Ber. d. k. sachs. Gesellsch. d. Wissensch., 1875, p. 252.
Quoted by Gaskell, Schafer's Text-book of Physiology, II, p. 225.
10. Howell: American Journal of Physiology, 1898, II, p. 47.
- Greene: Ibid, pp. 87-88.
11. Howell: American Journal of Physiology, 1898, II, p. 81; also,
Greene: Ibid, pp. 87-88.
12. Greene: Loc. cit., p. 93.

13. Guthrie and Pike: American Journal of Physiology, XVIII, p. 18, 1907.
14. Christiani: Journal de Physiologie et de Pathologie Generales, 1901, p. 204.
15. Heffter and Albanese: Archiv für experimentelle Pathologie und Pharmacologie, 1893, XXXII, p. 311; Archives italiennes de Biologie, 1896, XXV, p. 308. Quoted by Porter in American Text-book of Physiology, I, p. 191.
16. Locke: Journal of Physiology, 1895, XVIII, p. 332.
17. McGuigan: Science, N. S., 1908, XXV.
18. Locke and Rosenheim: Journal of Physiology, 1907, XXXVI, p. 205.
19. Martius: Archiv für Physiologie, 1882, p. 548.
- White: Journal of Physiology, 1896, XIX, p. 344.
20. Kronecker: Archiv für Physiologie, 1881, p. 569.
- Von Ott: Ibid, 1883, p. 1.
- Ringer: Journal of Physiology, 1885, VI, p. 364.
- Bufalini and Torcellini: Bolletino dalla Societa tra i cultori di scienze mediche, 1886, IV. Quoted by Guthrie and Pike, American Journal of Physiology, XVIII, p. 20. See also,
- Guthrie and Pike: Science, N. S., 1906, XXIV, p. 52; Biophysikalisches Centralblatt, 1906, II, 151.
21. Merunowicz: Loc. cit.
22. Literature cited under 5, above; also see,
Guthrie and Pike: American Journal of Physiology, 1907, XVIII, p. 14;
or, Guthrie: Bulletin Medical Department of Washington University, 1907, V, p. 77.
23. Guthrie and Pike: Loc. cit.
24. Kuliabko: Centralblatt für Physiologie, 1903, XVI, p. 331; Pfluger's Archive, XC, p. 461.
25. Manuscript in hands of printer.
26. Schafer: Proceedings of Royal Society, Edinburgh, XXV, Pt. I, p. 49.
Also, Lancet, May 30, 1903, pp. 15, 23, 24.
27. Richet: "Physiologie des muscles et des nerfs," Paris, 1882, p. 776.
Quoted by Sherrington in the English Text-book of Physiology, II, p. 835, to which the reader is referred for additional references.
28. Journal of Experimental Medicine, 1906, VIII, pp. 289, 321; also see,
Guthrie, Pike and Stewart: American Journal of Physiology, 1906, XVII, p. 344.
29. Guthrie: Demonstration before the American Physiological Society, January 2, 1908.
30. Carrel and Guthrie: Surgery, Gynecology and Obstetrics, 1906, II, p. 275.
31. Loc. cit., p. 281; also, Carrel, Journal of Experimental Medicine, 1908, X, pp. 130-1.
32. Carrel: Journal of Experimental Medicine, 1907, IX, p. 226.
Guthrie: American Journal of Physiology, 1907, XIX, p. 482.
Guthrie: Proceedings of the American Physiological Society, 1907.
33. Loc. cit.; also, Carrel: Journal of Experimental Medicine, 1908, X, pp. 130-1.
34. Guthrie: Proceedings of the American Physiological Society, 1907.
35. American Journal of Physiology, 1907, XIX, pp. 482-87.
36. Guthrie: Transplantation of Formaldehyde-Fixed Blood Vessels, Science, N. S., 1908, XXVII.
37. Eislerberg: Wiener Klinische Wochenschrift, 1892, No. 5, p. 81.
38. Christiani: Comptes Rendus des Seances de la Societe de Biologie, 1894, p. 716; and 1900, p. 967; Archives de Physiologie, 1895, XXVII, p. 65; Journal de Physiologie et de Pathologie Generales, 1901, p. 204.
39. Busch and Van Bergen: Proceedings of the American Physiological Society, American Journal of Physiology, 1905, XIII, p. xvi.
Carrel and Guthrie: Science, N. S., 1906, XXIII, pp. 394-395.
40. Science, N. S., 1906, XXIII, pp. 394-395.
41. Science, N. S., 1906, XXIII, pp. 393-394.

A REVIEW OF VAGINAL FIXATION OF THE UTERUS WITH
THE REPORT OF A SUCCESSFUL CASE.*

By FRANK A. GLASGOW, A. B., M. D., of St. Louis.

Professor Clinical Gynecology, Washington University.

As you are all aware, some kind of abdominal suspension has been the regular procedure in operating on procidentia uteri for some years past.

All these have appeared to me, to be wrong in principle and not particularly good in practice. In combination with perineal repair I, like others, have been guilty of so operating. It is an unnatural position, whether the uterus is fixed to the abdominal wall or drawn forward by the round ligaments. In any kind of suspension there must be much traction. We all know that a continual drag on a scar will end in that scar stretching. The round ligaments, in my opinion, were never intended for a support to the non-pregnant uterus, but only to act as stays to prevent the pregnant uterus from rotating. We all see cases where such attachments have pulled loose.

The only other procedure fashionable at present is removal of the uterus. I never could see the reason for this latter operation. How any one who knows how a swollen, hypertrophied uterus will shrink when held within the vagina, will advocate its removal, is beyond my comprehension. The mere weight of the organ can have nothing to do with the prolapse. Hysterectomy for this complaint has always appeared to me an irrational procedure. It will cure procidentia only when the perineum is repaired and the upper end of the vagina fixed to the broad ligaments, or abdomen. I think no one will deny this. We know that it can be cured by a high perineorrhaphy, and attachment of the upper end of the vagina to the pelvic fascia and broad ligaments. Hence the hysterectomy is not necessary. We can get the same results and restore the parts to a more normal condition by not removing the uterus.

Statistics of the result of the two operations are at hand only in regard to the perineal operation and vaginal fixation, and naturally these are not recent.

Pozzi quotes Hegar as reporting 400 cases with two deaths. Dorff, his assistant, looked up the results in 63. Of these 53 were well, nine of whom had borne children. There were ten failures, two of whom had borne children. Hegar in 150 cases had only one failure in three and a half years. Certainly a very excellent result. In Schroeder's clinic they had 67.5 per cent. of cures.

According to Pozzi, ventrofixation only holds the uterus forward, and is not better than shortening the round ligaments. This is also the opinion of others. Tait says, "for complete procidentia, perineorrhaphy is by far the best treatment and its results are generally permanent," a statement I cannot make concerning any other plan I have tried. Pen-

*Read before the St. Louis Surgical Society.

rose states, "the operation of ventrofixation is a useful adjunct in some cases. This operation is not intended to furnish a mechanical support to the uterus but only to keep it in a position of anteversion. In rare cases the uterus may be removed. This operation should not be proposed hastily. A plastic operation should be done more than once before resorting to it." Byford says, "seldom is a vaginal fixation without antefixation of the fundus per abdomen successful." This does not accord with the statements of the above quoted authors, or many others, besides Sims.

Garrigues reports that Munde cured a bad case by separating the cervix from the surrounding tissues and then amputating by the hot wire. The resulting cicatrix binding the vagina to the bases of the broad ligaments held up the vagina. Garrigues thinks that only in cases resisting every other measure should hysterectomy be done. Ashton mentions as operative procedures, only abdominal fixation and vaginal hysterectomy with fixation of the vagina in abdominal wound. Gilliam mentions Freund's silver wire encircling method of narrowing the vagina, also hysterectomy and ventrofixation.

Penrose is getting nearer my ideas. He calls attention to the immense shrinkage that takes place in vagina and uterus following rest in bed. He recommends that in repairing the perineum the denudation in the lateral sulci should extend high up the posterior vaginal wall in order to diminish the calibre of the vagina. He performs also a cystocele operation. This shows that although he was aware that he got better results from a high denudation, he thought it was because he narrowed the vagina more. He further says that Emmet's operation seems to be inefficient and in such cases the following operation is useful. "This consists in denuding a triangular area on the posterior vaginal wall, the apex being immediately below the cervix and the base at the ostium vaginae. The denudation should extend well on the vaginal walls. The denuded area is closed by sutures passed transversely."

Emmet's operation for the repair of the perineum, in spite of the praise bestowed on it by many good men, is in my opinion not to be compared to a high flap operation, commonly termed Tait's. Penrose apparently recognized this, yet still thought that the main object was narrowing the vagina. I myself have not done a cystocele operation for many years as I find it unnecessary. You will notice that all either use a perineal operation, in which the denudation extends high on the sides, or else get a denudation in the cervical locality in another way.

We see this also in the earlier operators. Marion Sims was as honest a man as ever graced our profession. He tells how he really blundered on to the fact that if two denudations were made, one on either side of the cervix, the cervix would be held back and the fundus kept in position and show little tendency to go backward. He operated on many cases with his triangular or trowel shaped denudation of the anterior wall and had only one failure, and even this one was cured by a subsequent similar operation.

In this operation the two upper ends of the denudation were on either side of the cervix. The lower part of the operation was practically an

operation for cystocele. In one case of Emmet's the lower part failed and only that part in front of the cervix held. Sims in speaking of this case says, "The fold thus formed (as in a sling) had retained the organ perfectly in place although below a cystocele existed. Future experience must demonstrate how far the formation of this fold can alone be relied on under the circumstances, yet it is evident in many cases this will prove all that is necessary to retain the uterus *in situ*."

Dr. Sims thought that he was holding up the uterus by narrowing the vagina. He evidently did more than this. He must have passed his sutures deep into the denuded areas and thus secured the fascia, and perhaps the base of the broad ligaments.

Many of his followers, probably being guided by the cuts, which could not show the depth of penetration of the needle, may have sewed only the mucous membrane. Of course this would fail. Sims says that he had only one failure by this operation and that was in the case of a debilitated old woman. This case even was cured by a subsequent operation.

In my limited research, Dudley is the only man who has the true idea of the method to be pursued in restoring the uterus to its normal position. He ascribes to Reynolds, of Boston, the suggestion of utilizing the base of the broad ligaments as a point of suspension. He performs intentionally what was done unknowingly by Sims and others when they denuded around the sides of the cervix and coaptated the denuded area in front of it, in this way bringing together in front of the cervix the bases of the broad ligaments. Dudley describes and pictures his operation very lucidly. To quote in short his description: He incises the vagina on the left of the cervix around in front to the right side; he now makes a median incision from this cut to near the meatus urinarius; the vagina is now separated from the base of the bladder, also from the tissues near the base of the broad ligaments. He now cuts away the redundant part of the mucous membrane of the anterior wall of the vagina. Next, two sutures are passed through the base of the broad ligament on the left and brought around in front of the cervix and passed through the base of the right broad ligament. When these are tied they bring the bases of the two broad ligaments together in front of the cervix, at the same time forcing this part of the uterus backwards. (I believe this procedure also shortens the sacro-uterine ligaments. F. A. G.)

The slit in the anterior wall is now closed, the lower part being closed transversely. In this way the uterus is tilted forward and hence shows little disposition to retrovert, at the same time the vagina is attached to the base of the broad ligaments and cannot prolapse. The operation which I report is essentially that of Dudley, but with some additional procedures which make it still more certain of success.

I first attached the cervix to the end of the blade of the speculum as Dudley recommends and find it an excellent suggestion. My incision around the cervix and down the vagina was made as Dudley suggests but did not extend so low toward the meatus urinarius.

I separated the vagina from the base of the bladder and the base of the broad ligaments, as Dudley did, but also separated the uterus from

the bladder, which he did not do. This was done in order to get a ligature through the fundus to hold it forward, as is done in vaginal fixation of the fundus. I now passed two chromacized ligatures through the bases of the broad ligaments and tied them in front of the cervix. The cervix was forced far back by this procedure. I next brought the fascia on either side of the vagina beneath the bladder, together under the bladder. In this way I got support from the fascia for the vagina and thickened the vagino-vesical septum.

After doing this as far as the lower end of the cut, I draw taut the thread holding the fundus forward and fasten it to the vagina. Now the cut in the anterior wall of the vagina was sewed. I did not remove any of the redundant mucous membrane of the vagina as Dudley does.

It is many years since I have removed mucous membrane from the anterior vaginal wall for cystocele. I have found that it is not necessary. Whenever the anterior wall is supported by a properly made perineum the cystocele will disappear. I now made a high Tait operation on the perineum, denuding high on either side of the vagina. I used buried sutures passed from side to side, and in this operation did not remove the flap. It is not only not necessary, but the posterior ridge formed acts as a pessary and holds up the cystocele until it disappears from shrinkage. The high denudation on the sides gets the fibres of the levator and assists materially in supporting the parts. In this way you can get as thick a perineum as you want.

There are some points in this operation which I think should be emphasized: First. Do not operate too soon. Hold up the uterus with tampon or pessaries until the parts are in good, healthy condition and have undergone as much involution as you may expect. It is marvelous to what extent and how soon involution takes place. Second. Get the bases of the broad ligament together. Third. Get the fascia on either side of the vagina together. Fourth. Draw uterus down toward this thickened fascia, but not far. Fifth. Leave all mucous membrane intact, both on anterior and posterior wall. Sixth. Get the fibres of the levator together.

The patient upon whom I operated was a very fleshy woman. The uterus was entirely outside of the vagina and the vagina inverted. As is usual in such cases the vagina and cervix were greatly hypertrophied and the cervix eroded. There was also some laceration of the cervix, which I did not think needed repairing. There is now (one and a half years after the operation) no protrusion of cervix, rectum or bladder, either on straining or standing. The anterior lip is readily felt at the upper portion of the perineum, but to reach the os externum you must go high and far back. The fundus is felt forward. The patient wore a Hodge pessary for a short time after the operation. She has been very comfortable since. Some things are forgotten in medicine and surgery and I believe vaginal fixation is one of them.

I believe that many of us will live to see the day when uterine suspension in any form will be considered poor surgery for the repair of an uncomplicated case of retroversion or procidentia uteri.

FIBROMA OF THE TRACHEA.

By WILLIAM E. SAUER, M. D., of St. Louis.

Fibromata as well as other new growths of the trachea, are not common occurrences. The majority of our American text books of the diseases of the nose and throat make no mention of them. Von Bruns, in his article on the neoplasms of the trachea in Hymann's *Handbuch der Laryngologie und Rhinologie*, states that tumors of the trachea are comparatively rare. He found among his records 300 laryngeal, and only 7 tracheal tumors. His review of the reported cases shows only 102 benign, and 45 malignant neoplasms of the trachea. Schech states in his *Krankheiten der Kehlkopfes u. d. Lufttröhre*, that new growths of the trachea may be classified as rare diseases. Moritz Schmidt found among 58,879 nose and throat patients which had come under his observation during 18 years, only 7 new growths in the trachea. Semon found among his classified reports of 10,000 benign laryngeal neoplasms, only one tracheal tumor to every 100 laryngeal. The case which I shall here relate is therefore deemed to be of sufficient interest to report in detail.

Charles B., age 74, a retired police officer, born in Germany, was referred to me on January 6, 1906. He had always enjoyed good health with the one exception, that he had had some trouble with his right eye, which was removed in 1882. (I learned later that this was a sarcoma of the conjunctiva; the enucleation had been performed by Dr. Alt, of St. Louis.) Since that time he had always enjoyed good health.

The family history is negative. For the past 5 or 6 months he had been more or less annoyed by an irritative cough, but this had not disturbed him in any degree until about a month ago, when the cough began to annoy him when lying down. He also noticed that there was considerable difficulty in breathing and he would become very short of breath when walking up a flight of stairs. He consulted his family physician, who diagnosed his trouble as a chronic bronchitis. The patient was given small doses of potassium iodide, but his cough became more aggravated, disturbing him greatly at night. The breathing became more difficult, and at times it seemed as though he could scarcely breathe at all. On examination I found him to be well nourished, weighing about 180 pounds; he claimed not to have lost any weight. The respirations were distinctly audible, and stertorous in character; his voice was somewhat hoarse. The slightest exertion brought on an attack of dyspnoea. The laryngoscopic examination revealed nothing abnormal in the larynx; but in the trachea a mass could be distinctly seen situated just above the bifurcation on the anterior wall; occupying at least two-thirds of the lumen of the trachea. The surface of the tumor was uneven and appeared somewhat pale. Considering the age of the patient and the appearance of the tumor, I suspected it to be malignant. I observed the patient for a few weeks and made repeated examinations; I also

attempted to make a direct examination with the Killian tracheoscope, but found that the patient could not stand this examination. During this time the cough had been getting more severe and the breathing more embarrassed; even the slightest exertion brought on an attack of dyspnoea. The patient found that he could rest more comfortably when lying on the abdomen. I had been seriously considering an attempt at removal of the growth under a general and local anæsthesia, but was deterred from this upon the advice of the internist who saw the case with me. He strongly advised against any operative interference owing to the advanced age of the patient and the presence of a well-marked myocarditis. The dyspnoea became so alarming and the patient was beginning to be very nervous, and insisted on having something done.

He was sent to the hospital and on February 12th a low tracheotomy was performed under primary chloroform anæsthesia. While on the table it was very difficult for the patient to breathe, and the tracheotomy had to be performed very hurriedly. After the trachea had been incised the respirations suddenly ceased and the patient became pulseless, and markedly cyanotic. Knowing that the obstruction was low down in the trachea, I quickly introduced a Killian bronchoscopic tube into the trachea, with the idea of passing the obstruction, so as to allow the air to pass through the tube. As soon as the tube had reached the vicinity of the bifurcation there was a sudden expiratory effort, and a portion of the growth was expelled through the tube; a second mass quickly followed. The patient began to breathe and the cyanosis began to disappear. Heart stimulants were administered and the pulse could be felt at the wrist. After a few minutes the patient's condition was fairly good. I attempted to get a view into the trachea, but owing to the rather profuse hemorrhage this was impossible. I then withdrew the tube and the hemorrhage gradually ceased. The patient developed a small pneumatic patch in the right lower lobe, which cleared up in about two weeks. There was a marked improvement in the breathing, and there was no dyspnoea; the tracheotomy wound was allowed to close. The patient soon regained his former health.

The method of procedure I had intended to follow was to introduce a Killian tube down to the mass and remove it with a cold snare, which I had had made for the purpose; or failing in this I intended to remove it piecemeal with the biting forceps of Killian. The two masses which were expelled through the tube were about $1\frac{1}{2}$ cm. long by $\frac{1}{2}$ cm. thick. They were cherry red, and had the macroscopic appearance of a papilloma. They were given to the pathologist, Dr. Gradwohl, who reports as follows:

"I beg to report that microscopical examination of the growth removed from the trachea submitted to me by you fails to reveal any signs of malignancy. The growth appears to be a simple polypus covered with normal mucous membrane, and showing a very slight amount of round cell infiltration. Fibrous tissue predominates in it. I made sections from three different places, all showing about the same picture. A slight deposit of hemosiderin was observed in some places."

The patient left the hospital on March 4th. An examination revealed

that there was still a mass on the anterior wall of the trachea, occupying nearly one-half of its lumen. The patient claimed that he felt no inconvenience and there was no shortness of breath, even after exertion. A month later I noticed that there was a slight increase in the size of the growth, and it appeared to be extending upward along the anterior wall, but not encroaching on more than half the lumen of the trachea. The general health of the patient is surprisingly good. On December 28, the patient again returned stating that he had noticed during the last few weeks, after an exposure, that there was considerable difficulty in breathing, especially at night. The examination showed that there had been a considerable increase in the size of the growth, and that the upper portion of the growth seemed to have extended up as far as the 5th or 6th ring, and occupied more than half the lumen of the trachea. An examination of the chest reveals an acute bronchitis. The patient was given a sedative, and when I saw him on Jan. 3, there was a decided improvement both in the cough and the breathing, although there was no noticeable change in the trachea. At the present time the patient weighs nearly 200 pounds.

Von Brun's review of the literature in 1898 shows that up to that time, only 23 cases of fibromata of the trachea have been recorded. Since that time only 6 cases have been added to this list; including the case I have just reported, making 29 in all. I shall review these cases briefly, in the chronological order of their report.

CASE 1. The first fibroma which is also the first new growth of the trachea recorded, is the case reported by Lieutaud, in 1767. The case was that of a boy, in which a polypus with a long pedicle, having its origin in the trachea, had been carried into the glottis by the expiratory air current, causing sudden death.

CASE 2. Stallard reports the case of a man aged 40 years, admitted to the hospital April 25, 1843, in a condition of general weakness, with symptoms of bronchitis. He had been asthmatic a long time. Patient died four days after entering the hospital after a fit of coughing which lasted an hour. Autopsy showed emphysema of the lungs. The bronchioles were healthy, but the right and left divisions of the trachea were congested. In the trachea there was a polypus about the size of an almond.

CASE 3. Reported by Rokitansky. Patient female, age 35 years; mother of two children. Had noticed a change of voice for 4 or 5 years, and finally at intervals lost her voice entirely. In March, 1844, had a spell of suffocation; there was dyspnoea and pain upon making an effort to cough. A polyp was discovered between the cords and another further down in the trachea. A tracheotomy was performed and a cannula was inserted; the patient made a good recovery but the voice remained the same. A few months later the patient died of a follicular enteritis. Autopsy showed that the original fibroid had been attached to the trachea just below the larynx.

CASE 4. Smoler reports a case, male, age 22, well nourished. Some years before had had an attack of catarrhal pneumonia during which, hemoptysis with febrile symptoms had occurred. Later on these symp-

toms were reproduced without any apparent cause. The patient was almost constantly suffering from asthma; an examination of the lungs by percussion revealed a tympanic sound in the right clavicular region. Auscultation revealed some râles; the heart was hypertrophied, the abdominal organs were normal. There was short breathing and palpitation when ascending stairs. Violent fits of coughing, cyanosis, and sweats with purulent expectoration. Patient has a good tenor voice and was able to sing. Parents had died of "lung disease" at advanced age. Autopsy, lungs filled with reddish brown fluid; no evidence of tuberculosis. Bronchi dilated and filled with fluid. Heart cavities slightly dilated. The finger introduced into the trachea encounters a tumor the size of a large nut, which completely obstructed the organ. It has a broad base and extends from the 1st to the 7th cartilage. Diagnosis: fibroma of the trachea was confirmed by microscopic examination.

CASE 5. Reported by Fifield. The patient was first seen at her confinement in 1857, then 16 years old and healthy. Father asthmatic. Two years later began to have attacks of asthma, which increased in severity until January, 1860, when well marked symptoms of hysteria developed. The asthmatic paroxysms were remarkably severe. In March of the same year there was severe cough with bloody expectoration. Bronchial râles were heard all over the chest and the case was diagnosed as a tubercular condition. For several months the patient had not been able to lie down, but slept in chairs. On August 20, 1860, she developed measles, after which she remained in better health through the winter and spring. In July, 1861, the patient began to lose ground rapidly. She became very pale, dyspnoea became more marked and the feet and ankles were swollen. Auscultation showed besides the usual râles a well marked "bruit de diable" in the neck. Patient died on July 14, 1861. The autopsy showed, the heart healthy, lungs free from tuberculosis; no emphysema. The right bronchus presented superficial erosions. The smaller divisions were filled with semi-purulent mucus. Upon examining the left bronchus the opening could not be found at first. It was perfectly covered by a firm rosy polypus the size of a small grape. The pedicle was attached to the trachea at the mouth of the bronchus, acting as a ball valve, allowing expiration but forbidding inspiration.

CASE 6. Tuerck had observed a patient, age 37, in private practice. There had been little difficulty in breathing. The patient died of phthisis. The autopsy revealed a tumor 6 mm. long, by 2 to 4 mm. thick, situated in the upper part of the trachea attached to the posterior wall. The diagnosis was confirmed by the microscope.

CASE 7. Reported by Gerhardt. Female, age 34. Never had any respiratory difficulty. In November, 1864, the patient died of acute yellow atrophy of the liver. At the autopsy there was found situated above the bifurcation at the level of the 8th ring somewhat to the left, a small polyp $\frac{1}{4}$ cm. wide, by 1 cm. long.

CASE 8. Also reported by Gerhardt. A girl aged 25 was first observed in 1853. The first symptoms noticed were a shortness of breath, which gradually increased; followed two weeks later by a cough. In the

middle of October her breathing was much embarrassed. She was compelled to go to bed; keeping the upper part of her body elevated. She complained of pain in the breast and right side of the neck. The voice was deep and hoarse. A laryngoscopic examination in March revealed a reddish tumor in the trachea near the 6th ring on the left side, only a small space was left for respiration. On March 29 a sound was passed. The breathing became more labored and the cough aggravated. On March 31, the dyspnoea increased, with cyanosis and bloody expectoration. Her condition grew worse and she finally died April 5th. The autopsy showed an acute bronchitis, emphysema of the lungs and some oedema. The tumor was 3 cm. long, by $1\frac{1}{2}$ cm. wide; the pedicle was 2 cm. in length.

Mackenzie reports the following four cases of tracheal fibromata:

CASE 9. Male, aged 41, entered hospital in March, 1865, with hoarseness and slight dyspnoea. The larynx was found congested, and was treated with astringents. On October 16th a growth was seen about the size of a bean, occupying the 2nd and 3rd ring of the trachea. In November several unsuccessful attempts to remove it with a forceps were made, but on December 21, 1865, the growth was touched with electric cautery; one week later no sign of it could be seen.

CASE 10. Female, age 10. First applied at hospital suffering from dyspnoea and weakness of voice. A growth about the size of a pea was seen on the 3rd ring of the trachea, rather to the left side of the median line. On attempting to remove the growth with the cautery, the patient moved and both cords were injured. The patient did not return for further treatment.

CASE 11. Age 37, was seen in March, 1874. He was suffering from dyspnoea and hoarseness. A growth was seen just above the anterior commissure, which was removed with the forceps; a growth about the size of a currant was then seen occupying the 1st and 2nd ring of the trachea. The cricoid cartilage could be distinctly seen above it. After two failures the polyp was touched with the galvano-cautery; a week later no sign of it was seen.

CASE 12. Male, aged 45, applied at the hospital on June 15, 1876, suffering from dyspnoea. A smooth red polyp about the size of a grape was seen covering the 4th, 5th and 6th rings of the trachea. A tracheotomy was proposed but refused. The patient died three months later of apoplexy. No post mortem.

CASE 13. Man, age 63, was first seen by Ingals in 1881, with symptoms of laryngitis. In February, 1883, the author discovered a growth in the trachea 4 to 5 cm. below the larynx. It was sessile and flattened in form, standing out from the surface of the trachea about 5 mm. and occupying an area ranging from 8 to 12 mm. in its various diameters. It was of a reddish color and granular. There was no inconvenience in breathing and no noticeable size of the tumor when seen six months later. There was no attempt at removal.

CASE 14. Reported by Stoerk. This case was that of a midwife 40 years of age, who had difficulty in breathing. A laryngeal examination revealed a fibroma the size of a bean in the upper part of the trachea.

The patient refused a tracheotomy, so was allowed to go without further treatment.

CASE 15. This case, reported by Masini, has been considered a typical one. It was a fibro-myxoma situated upon the 1st ring of the trachea and on phonation could be seen below the cords. It was extirpated through the mouth with a modified Mackenzie's forceps under cocaine anæsthesia.

CASE 16. Lewin presented a patient who had been wearing a tracheotomy tube for 24 years. The patient had always been perspiring, coughing and subject to fits of suffocation. The laryngoscopic examination revealed a redness and swelling of the vocal cords and a fibroid tumor which grew out from the posterior wall of the trachea. After the tracheotomy the patient showed great improvement, could speak well and breathe well. Further operation was refused by the patient.

CASE 17. Langlet mentions a case of a man, age 60, who was seen in 1886 with marked symptoms of obstruction, cough and pain on swallowing. He also complained of a feeling of foreign body in the throat. The voice was hoarse. Auscultation revealed generalized mucous rales. No abnormal signs were detected by percussion. The patient was given jaborandi in two gram doses, which seemed to relieve him for a time. A laryngoscopic examination showed no foreign body nor tumor of the vocal cord. The patient began to have severe attacks of suffocation and succumbed July 14, 1886. The autopsy showed a small white lobulated tumor the size of a small nut 3 cm. above the bifurcation of the bronchus. A part of this tumor had become detached and fixed itself in the larynx, causing a rapid asphyxia.

CASE 18. Braun reports a case, male, age 40, sent to the author in February, 1889, by Dr. Escher with a diagnosis of tracheal polypus complicated with laryngeal troubles. The history showed that the patient had been hoarse for ten years without any other noteworthy symptoms. He began to have a feeling of pressure in the throat, constant coughing and dyspnoea when lying down or sleeping. The hereditary history of the patient was negative. Inspection showed a short thick neck "and highly arched tongue." The opening of the larynx was narrow, the breathing was labored. Upon deep inspiration it was possible to see a thick white tumor 1 cm. below the anterior commissure, which moved backwards and forwards. It was found that a 20 per cent. solution of cocaine not only would not anæsthetize the growth but produce hyperæsthesia. Five weeks later the author removed the growth with a forceps. The patient made an uneventful recovery and there was no recurrence.

CASE 19. Reported by Oazmann, in which a polypus of the larynx and of the trachea was extirpated at one time. This was followed by a recurrence. Laryngotomy and cauterization were next done; this was also followed by a recurrence. The removal was then made through the mouth and the patient given potassium iodide internally. No recurrence after five years. The age not stated.

CASE 20. Bidwell showed to the Pathological Society of London a specimen of a fibroid polypus of the trachea. It was taken from a boy

five years of age who died from asphyxia at the Evelina Hospital for Children. The polypus was the size of a small marble and was attached to the posterior wall of the trachea by a distinct pedicle. On microscopic examination the growth was found to consist of fibrous and cellular elements without any distinct evidence of sarcoma, except that some of the nuclei appeared to be becoming spindle shaped. There was no sign of disease in any other organ; the child had suffered from symptoms for fourteen days and tracheotomy had been performed without relief two days before death. This was the first case of fibroid polypus of the trachea shown to the Society.

CASE 21. Avellis reports a case, male 50 years of age who had been suffering for a long time with a large struma and marked difficulty in breathing. The author was called because the patient had coughed up some blood. Pharynx and nose hyperemic. The left vocal cord was paralyzed and fixed. The larynx was markedly scoliotic, and the trachea involved lower down. The author discovered a body which moved upon breathing but an accurate examination could not be made. The source of the hemorrhage was not discovered. A few days later the patient developed symptoms of pneumonia. The autopsy showed that the left vocal cord was somewhat atropic and fibrous. Near the 7th and 8th tracheal ring the polypus was seen; it was like the whole of the tracheal mucosa, somewhat red, not bleeding and could be moved easily by the sound. Later examination revealed a beginning sarcoma.

CASE 22. Krieg in his *Atlas der Kehlkopfkrankheiten* gives an illustration in which a fibroma situated just above the bifurcation on the posterior wall of the trachea almost obstructing the entire lumen. I was unable to find anything further regarding the case.

CASE 23. Schmidt in speaking of fibroma of the trachea in his *Krankheiten der Oberrn Luftwege* refers to Tuerk's and Stoerk's cases, and then states that Boeckenhimer had seen a lympho-fibroma in the trachea which was operated upon with good results.

CASE 24. Eppinger reports the case of a man age 23 who had died suddenly; a round tumor as large as a hazel nut was found on the posterior wall of the trachea 4 to 5 cm. above the bifurcation. The diagnosis was verified by the microscope.

CASE 25. Jurasz reported a case of a male, age 38 years, who had been suffering from hoarseness of a slight degree for more than a year, but which in the last two months had become troublesome. The breathing was somewhat impaired. On laryngoscopic examination a polypus the size of a small hazel nut could be seen which had its origin in the trachea. The growth moved with each inspiration and expiration. No attempt at removal had been made.

CASE 26. Rosenfeld mentions a case in which a polyp the size of a pea, having its origin on the anterior wall of the left bronchus, which after an attack of coughing could be seen lying over the bifurcation.

CASE 27. Ogle reports a case of a child one and one-half years of age, admitted to the hospital apparently in good health, but was readmitted the same day with dyspnoea. The mother said the patient had several "spells of short breathing" on the way home. A second tracheotomy was

done and the patient died. A tumor was found attached by a pedicle at the site of the first tracheotomy. The author believes that the asphyxia might have been due to a cold after leaving the hospital; or it might have been due to a spasm. The tumor seems to have been a fibroma.

CASE 28. Marcel and Zigura report a case of fibroma of the trachea in a patient aged 33. The tumor was the size of a hazel nut. It was removed and no recurrence followed. The tumor was examined by Babes, and pronounced "a typical fibroma."

An analysis of the reported cases shows that fibromata may be found at all ages. One patient was below 2 years; three patients between 5 and 15; three between 20 and 30; seven between 30 and 40; three between 40 and 50; two between 60 and 70, and one over 70; in eight the age was not stated. The sexes are about equally divided. Eleven of the cases were males, and seven females, and in ten the sex was not recorded.

The size of the growths varies from that of a small pea to that of a large nut. In the case of Smoler, the growth completely obstructed the trachea. The location of the tumors was also a variable one, as they were found in all parts of the trachea. In one of Mackenzie's cases the growth was attached to the first ring of the trachea. In Rosenfeld's case the origin of the growth was in the left bronchus.

The symptoms varied from a slight hoarseness, weakness of voice, cough, dyspnoea, asthmatic symptoms, attacks of suffocation and asphyxia, ending in death. In nine of these cases death had occurred from suffocation. The amount of disturbance depends on the size and location of the growth. In Langlet's case there was a feeling of foreign body which the patient attempted to cough up; this cough was followed by spells of suffocation. In Rokitansky's case there was pain in the chest on coughing. In Smoler's case there were symptoms of catarrhal pneumonia without fever; these attacks were brought on without any apparent cause. In Braun's case there was hoarseness for ten years without any other symptoms. Fifield's case showed marked asthmatic symptoms for more than three years and the case was believed to be tuberculosis. In Ingal's case, a growth situated 5 cm. below the larynx and extending 5 mm. out from the surface of the trachea and occupying an area varying from 8 to 12 mm. in its various diameters, produced no symptoms. In four cases reported by Mackenzie the growths varied in size from a small pea to a grape. In all the cases there was a noticeable dyspnoea with hoarseness.

A positive clinical diagnosis was made in sixteen of these cases; the others were diagnosed on the post mortem table. Five of the cases were recorded before the discovery of the laryngoscope; these were diagnosed at the autopsy. Tuerck was the first to see a tracheal growth in the laryngeal mirror. With the further development of the direct methods of examination more of these cases will be recorded.

A histological examination was made in only nine of the cases. In Ogle's case the growth had its origin at the site of the tracheotomy wound, and as a histological examination was not made this case was in all likelihood a granulation tumor, and not a true new growth. In the

case of Avellis a beginning sarcoma was discovered later. In Bidwell's case some of the nuclei appeared to be becoming spindle shaped. This seems to bear out the statement of Proebsting that no conclusions should be drawn from a macroscopic appearance of these tracheal growths. He reports a case in which a polyp with a small pedicle had been coughed up and brought to him by the patient. Proebsting could distinctly see the remaining portion of the pedicle in the trachea. The macroscopic appearance was that of a typical mucous polyp; a microscopic examination, however, revealed carcinomatous elements in the interior of the polyp. The patient died nine months later of carcinoma of the trachea and left lung. In the case reported above by me, sections were made by four different pathologists, and no evidence of malignancy was found in any of the slides examined.

Attempts at removal were made in only six of the cases. In Braun's and Massini's cases the growths were removed through the mouth by forceps; they were situated high up in the trachea. In Oazmann's case the growth was first removed with the forceps through the mouth. A recurrence followed. A thyrotomy was done followed by a second recurrence. A third removal was made through the mouth and proved to be successful. In two of Mackenzie's cases the growths were destroyed by the galvano-cautery. In one case reported by Mackenzie the vocal cords were injured in attempting to cauterize the growth; further attempts were then refused. In Lewin's and Ogle's cases a tracheotomy was done, but no attempts at removal were made. In Gerhardt's case a sound was introduced into the trachea; death followed several days later. In my own case a partial removal was done with relief for eleven months. The patient is still quite comfortable.

Regarding the prognosis of these tumors, the cases of Proebsting and Avellis should again be borne in mind, and a careful microscopic examination should not be neglected, even when the macroscopic appearances are typical. A great advance in the operative technic of these cases has been made through the development of tracheoscopy and bronchoscopy, as done by Killian and others. With the aid of these the removal of the growths situated low down in the trachea or even in the bronchi themselves is no longer an impossibility.

Humboldt Building.

THE FLANNEL ROLLER-BANDAGE IN THE TREATMENT OF UMBILICAL HERNIA IN THE INFANT.*

By A. S. BLEYER, M. D., of St. Louis.

The small umbilical hernia that so frequently appears between the sixth week and third or fourth month of life can doubtless be prevented by the use of the belly-band in the hands of the careful and intelligent mother, in the majority of cases.

It is probable that rupture at this point is most likely to be seen in those babies that have not been so protected. Again, it seems to be in this class of patients that attacks of persistent hard crying or coughing are allowed to continue without inquiry into their cause. It is in this class that we see rickets and marasmus and diarrhoea.

Whatever the anatomical or mechanical starting point of these acquired herniæ may be, their course is usually benign, they most frequently disappear of themselves, since the condition is far less often seen in childhood than in infancy. It is uncommon to see an umbilical hernia in youth or even childhood, and it is very common indeed to see them in infants, especially in dispensary practice. Kerley states that ten per cent. of babies under six months of age seen in dispensary practice have umbilical herniæ. This percentage likewise obtains in those babies coming to our clinics.

The recovery that occurs in the majority of these cases can not be said to be due to treatment, since the majority are not treated at all by the general practitioner. They are therefore benign and tend to recover. For many clinical reasons some treatment is nevertheless indicated and the most rational treatment would seem to be to prevent the recurrence of the extrusion until the ring has closed with the growth of the child.

The use of a spring steel truss can not be considered in this region, because of the variation in the size of the abdomen that may occur from hour to hour in the infant. The use of any apparatus of fixed size, whether made of leather or steel would be undesirable for the same reason. Furthermore the application of pressure by means of a hard substance at this point is attended by danger, because of the deficient vitality of the surface tissues. Lastly, the use of a button made of wood, ivory or some metal does not seem rational; point pressure is essentially bad, it must interfere with circulation and must therefore tend to defeat the very purpose of treatment.

It has doubtless been for these reasons that pediatricists have largely adopted the use of adhesive-plaster strips or the abdominal binder in these cases. Most writers seem to favor the zinc oxide adhesive strips placed either entirely around the body of the child or only a few inches to each side of the navel.

The disadvantages of the adhesive strips are, that since they must be worn for at least four months they are sure to cause skin disturbances,

*Read before Bethesda Pediatric Society, March 20th, 1908.

which are occasionally extremely troublesome. If they are used they must be changed at least every two or three weeks, and must be replaced in approximately the same area each time, that is transversely across the abdomen. It is possible to cross them diagonally over the navel, but they can not do very much good in this position, since they will wrinkle with the movements of the child, after the first few days. Again, the adhesive strip interferes with the bathing of the child, and it is out of the question to remove it every day or two for this purpose.

Observation of a few cases and closer study of a more recent one have made me think that the ordinary abdominal binder that is also often used is not an adequate means of preventing the recurrence of the extrusion. The abdominal binder never remains smoothly in place, it is too broad over the abdomen and is displaced by the thigh flexions and constant movements of the child. The use of shoulder straps, adjusted by pinning and not by sewing is an aid and do help to maintain the desired immobility of the binder. The use of perineal straps is wholly impracticable, they can not be made to fit properly about the thighs for obvious reasons, they can not be kept clean and they are a constant source of irritation at points that are especially exposed to inflammation from other causes.

To solve these difficulties I have made use of a rather narrow roller bandage of moderately heavy flannel. Flannel was selected because of its general advantages for belly-bands in infants and because of the fact that it is more snug-fitting and that one layer can not slip when applied snugly over another layer.

A bandage of two to two and a half inches in width and sufficiently long to make three and a half turns of the body answers the purpose very well. It is applied by spreading one end upon a table and so placing the child upon it in the recumbent position, that the free end can be brought forward to a point above the iliac spine, directly opposite the navel. This end is now used as a point of resistance in applying the first turn of the roller-end of the bandage, which is made to pass exactly over the navel and to grasp the opposing part of bandage as it completes the first turn. Holt and others recommend that a fold of skin from the sides of navel be turned in after the omphalocele has been replaced.

The first step in the application of the bandage must be made firmly, but not tightly and with precision, the second layer of the bandage must now pass a little less than an inch lower than the first, so that its upper margin well covers the umbilicus, the third layer passes one inch above the first layer, so that when the bandage is in place, we have a belt of three layers of flannel, about one inch wide, passing over the navel and the remainder of the abdomen covered by a single layer which takes the place of the ordinary belly-band.

The support remains in place very well and there are no appendages to be dealt with, besides this, pressure symptoms will not occur and the bandage can be adjusted and readjusted according to the needs of the case, once the mother has carefully studied the principle of its use.

The application of the method requires dexterity, intelligence and constant watchfulness, and if these are obtainable in a given case, it should be followed by good results.

MEDICAL AND SURGICAL PROGRESS.

THE NEW CONJUNCTIVAL AND CUTANEOUS TESTS FOR TUBERCULOSIS.

A REVIEW OF RECENT LITERATURE.

By ALBERT E. TAUSSIG, M. D.

1. DIE WISSENSCHAFTLICHE UND PRAKTISCHE BEDEUTUNG DER OPHTHALMODIAGNOSTIK DER TUBERKULOSE.—Citron (*Deutsch. med. Wochenschr.*, 1908, No. 8).
2. KONJUNKTIVALREAKTION IN DER UROLOGIE.—Necker and Paschkis (*Wien. klin. Wochenschr.*, 1908, No. 5).
3. DIE PROGNOSTISCHE BEDEUTUNG DER KONJUNKTIVALEN UND KUTANEN TUBERKULINREAKTIONEN.—Wolff-Eisner (*Berl. klin. Wochenschr.*, 1908, No. 2).
4. UEBER KUTANE UND KONJUNKTIVALE TUBERKULINREAKTION.—Stadelmann (*Muench. med. Wochenschr.*, 1908, No. 2).
5. OCULAR TUBERCULIN REACTION IN CATTLE.—McCampbell and White (*J'l of Exp. Med.*, 1908, March).
6. DIE OPHTHALMOREAKTION AUF TUBERKULIN ALS DIAGNOSTISCHES HILFSMITTEL.—Plehn (*Deutsch. med. Wochenschr.*, 1908, No. 8).
7. BEITRAEGE ZU DEN NEUEREN UNTERSUCHUNGSMETHODEN ZUR ERKENNUNG DER TUBERKULOSE.—Levi (*Berl. klin. Wochenschr.*, 1908, No. 5).
8. NACHTHEILE UND GEFAHREN DER CONJUNCTIVALEN TUBERKULINREAKTION.—Collin (*Medizin. Klinik*, 1908, No. 5).
9. UEBER EINE DIAGNOSTISCH VERWERTHBARE REAKTION DER HAUT AUF EINREIBUNG MIT TUBERKULINSALBE.—Moro (*Muench. med. Wochenschr.*, 1908, No. 5).
10. VERGLEICHENDE UNTERSUCHUNGEN MIT DER KONJUNKTIVALREAKTION NACH WOLFF-EISNER UND DER SALBENREAKTION NACH MORO.—Heinemann (*Muench. med. Wochenschr.*, 1908, No. 11).

Conjunctival test: Instil into one eye, one drop of a one per cent. solution of tuberculin. A slight conjunctivitis indicates a positive reaction.

Cutaneous test: Inoculate, as in ordinary vaccination, the patient with a trace or dilute (1 to 4) tuberculin. A positive reaction is shown by the appearance of a small papule at the site of inoculation.

Ever since v. Pirquet announced his cutaneous test for tuberculosis and Calmette and Wolff-Eisner their conjunctival methods, medical literature, especially in Germany, has been filled with discussions of these tests. A more or less complete summary of the publications on this subject in 1907 will be found in the January issue of this journal. So much new work has been done since that time, however, that it seems worth while to go into the matter once more. On the whole the conjunctival method has had the best of it, the cutaneous method having excited much less interest. Citron (1) whose experience with the conjunctival method is extensive, enthusiastically maintains its diagnostic value. He has worked out a technique of his own in which he uses only old tuberculin made according to Koch's directions and freshly diluted.

He instils one drop of a two per cent. solution into one eye. If the reaction is positive, he instils a drop of a one per cent. solution into the other eye. A positive reaction here also is strong evidence in favor of the presence of tuberculosis. If, however, the first reaction was negative, he instils one drop of a four per cent. solution into the other eye. A negative reaction here speaks against the presence of tuberculosis. Where the first and second tests fail to agree the significance of the reactions is dubious. He considers the presence of any ophthalmic disease a contraindication to the application of the test and in scrophulous children, where the reaction is often excessive, he advises the use of dilutions not stronger than one fourth of one per cent. Necker and Paschkis (2) find that in urologic cases the conjunctival test is almost pathognomonic. They tested a large number of cases of suspected renal tuberculosis both by the conjunctival method and by injecting the urinary sediment into animals. Whenever animal experiment proved the presence of urogenital tuberculosis the conjunctival test was positive and vice versa. They advise that in every case of pyuria or hematuria in which a tuberculous process is suspected, the conjunctival test be done and believe that thereby animal inoculation can be dispensed with.

The discoverer of the conjunctival method, Wolff-Eisner (3), considers the diagnostic value of his test established but maintains that it has also a prognostic value. He believes that the intensity of the reaction is a measure of the resisting power of the body so that where the power of the individual to resist the tuberculous process is great, the reaction will be strong and vice versa. Thus he finds that in incipient tuberculosis and in more advanced cases with a good prognosis the reaction is marked. In the terminal stage of the disease and in those early cases that do badly, the reaction is weak or even negative. Reactions that are delayed in their beginning and prolonged in their course are usually found in individuals that show no clinical evidence of tuberculosis. Stadelmann (4) agrees with him in this estimate of the prognostic value of the test. He prefers the conjunctival to the cutaneous method if only because healthy individuals react positively to the former in only one-sixth, to the latter in over one-half of all cases.

McCampbell and White (5) find the conjunctival reaction useful in testing cattle. It produces, if positive, a conjunctivitis as in human beings and permits the observer to dispense with the troublesome close observation of the animal, the taking of temperatures and the like. Moreover, animals seem to react to the conjunctival test when, on account of previous injections of tuberculin, they fail to react to renewed injections. Further observations, however, are required before the new method can displace the old.

In the chorus of approval there is, however, no lack of dissenting voices. Plehn's (6) experience with the conjunctival method has not at all convinced him of its value. He objects in the first place that many plainly tuberculous individuals fail to give a positive reaction, a statement in which all observers agree. But what is worse he obtained a positive reaction in a considerable proportion of non-tuberculous patients. Thus two out of five cases of typhoid, two out of five cases of scarlet fever, six out of twelve cases of rheumatism, three out of six with acute bronchitis and several cases of enteritis reacted positively. None of these patients showed any evidence of tuberculosis. Moreover unpleasantly severe reactions were not uncommon. Phlyctenular keratitis, corneal opacity, severe purulent blenorrhœa occasionally resulted, though permanent ill effects were never observed. He considers the reaction not specific and not harmless and continues to prefer the older method of

subcutaneous injection. Similarly in 120 cases of surgical tuberculosis, Levi (7) obtained a positive conjunctival test in only 69 per cent. and often observed a severe conjunctivitis, once even a purulent ophthalmia, so that he, too, has discarded the method. Collin (8) saw five serious and obstinate, though not permanent, ocular lesions out of thirty cases tested by the conjunctival method. He also advises against its general use. Heinemann (10) concedes the diagnostic value of the method but has not found that information of prognostic value can be obtained from it. He believes that a negative reaction in unquestionable cases of tuberculosis does not necessarily mean a bad prognosis. Twice a negative reaction in incipient phthisis seemed to be due to a severe anemia and once to no ascertainable cause. All three cases are doing well. He, too, occasionally observed severe conjunctivitis following the test, once lasting two weeks.

Apparently each method has its advantages and its disadvantages. The cutaneous method of v. Pirquet if positive has in adults comparatively little significance but if negative speaks strongly against the presence of tuberculosis except in those advanced cases in which the diagnosis is clear without its use. This method has the advantage of being absolutely harmless and of never incommoding the patient beyond the slight pain of the inoculation and a mild itching or burning if the test is strongly positive. The conjunctival method on the other hand is more significant if positive and possibly has a more or less definite prognostic value. It, however, occasionally produces unpleasant after-effects and should be used cautiously, if at all, in scrophulous individuals or in those with ophthalmic disorders. Neither test is absolutely pathognomonic and neither can replace close clinical observation and the usual laboratory methods. Both, however, stand as valuable additions to our diagnostic armamentarium. Koch's original method of injecting tuberculin hypodermically produces much more definite results than these newer methods whether positive or negative. It often, however, produces severe and unpleasant general reactions (fever, pain, malaise) and is entirely inapplicable, when there is any fever.

Moro (9) has modified v. Pirquet's method in an interesting manner. Instead of inoculating the patient with dilute tuberculin he rubs into the unbroken skin a tuberculin ointment. The latter is prepared by rubbing up together equal parts of tuberculin and warm lanolin, thus making a fifty per cent. ointment. If kept on ice it remains active indefinitely. A piece of ointment the size of a pea is rubbed into the skin of the epigastrium and allowed to remain there without any dressing. If negative no reaction whatever occurs; a positive reaction is shown by the appearance of nodules or papules at the site of enunction. Moro calls a positive reaction weak if a few reddish nodules appear without itching, moderate if many (100 or more) reddish nodules are seen with slight dermatitis and a little itching, strong where there are many large and small nodules, considerable dermatitis and much itching. A strong reaction is rare, occurring in only 3 out of 37 tests. Moro has used the method only with children but for them has found it quite as specific as v. Pirquet's and in clinically healthy children giving a positive reaction less frequently. It is entirely harmless and never produces any general reaction. Heinemann (10) has been able to confirm Moro's results and endorses his method without reserve.

THE PRESENT STATUS OF OPHTHALMIC-DIAGNOSIS OF TUBERCULOSIS.

A REVIEW OF RECENT LITERATURE.

By CARL FISCH, M. D.

1. CUTANE UND CONJUNCTIVALE TUBERCULIN INJECTION.—M. Wolff (*Berl. Klin. Woch.*, 1908, No. 6).
2. DIE WISSENSCHAFTLICHE UND PRAKTISCHE BEDEUTUNG DER OPHTHALMISCHEN DIAGNOSE DER TUBERCULOSIS.—J. Citron (*Deutsch. Med. Woch.*, 1908, No. 3).
3. VERGLEICHENDE BEWERTHUNG DER TUBERCULIN REACTION IN KINDESALTER.—Fr. Beuschel (*Münch. Med. Woch.*, 1908, No. 7).
4. SALBENREACTION FÜR TUBERCULOSE.—E. Moro (*Münch. Med. Woch.*, 1908, No. 5).
5. DIE CUTANE UND CONJUNCTIVALE TUBERCULIN REACTION AN THIEREN.—H. Wildholz (*Berl. Kl. Woch.*, 1908, No. 11).
6. TUBERCULOSE STUDIEN. (*Virch. Archiv.* Beiheft zum 190. Bande).
7. Pirquet. (*Wien. Klin. Woch.*, 1907, No. 28 und 1907, No. 28. *Berl. Klin. Woch.*, 1907, No. 22).
8. Wolff-Eisner. (*Berl. Klin. Woch.*, 1907, No. 22).
9. Calmette. (*Academie des Sciences*, June 17, 1907).
10. Valée. (*Academie des Sciences*, June 17, 1907).
11. Lapersonne. (*Presse Médicale*, 1907, No. 99).
12. Calmette, Breton and Petit. (*Compt. rend. de la Soc. de Biologie*, October 12, 1907).
13. Lépine. (*Compt. rend. de la Soc. de Biologie*, July 27 and October 19, 1907).

Historically the date of birth of the ophthalmic reaction is coincident with that of the cutaneous reaction of Pirquet. At the meeting in Berlin on May 15th, 1906, Wolff-Eisner claimed that the value of Pirquet's method was restricted to young children, as experiments had shown that the cutaneous reaction was positive in a great number of individuals of normal health. In other words the cutaneous reaction is evidence only for the presence of a tuberculous focus somewhere and not for the activity of this focus,—the same as the subcutaneous tuberculin reaction. With our experience of the great frequency of such occult and encapsulated foci, never causing general infection, the positive result of Pirquet's test would, in clinically obscure cases, very often fail to elucidate the character of the pathologic condition existing when the presence of the focus had no relation to it. While in healthy children, between five and eight years of age, the percentage of positive reactions is very high (30 per cent.), it is almost the rule in all normal adults. Conclusions here without clinical indications are unjustified. Although Pirquet's method is of course positive in the majority of cases of active tuberculosis, it is liable to mislead in the diagnosis. The conjunctival reaction, as first studied by Wolff-Eisner, determined also the positiveness in the majority of healthy persons. This was due to the fact that in this work a 10 per cent. solution of tuberculin was used, a concentration too high and too massive. The effect on the inoculated persons was very serious and grave. Wolff-Eisner's work was taken up in France by Vallée with the

same serious effect on the subject. Calmette studied the question at the same time by using weaker solutions, and reported success in a great number of cases. His method was confirmed by Letulle, and Dufour in France and by Citron in Germany. Citron was the first to study the character of the reaction in its biologic aspect. He established the fact that it was positive alone in cases of active tuberculosis. On the other hand, reactions were obtained, also, although in a small percentage, of normal and sick individuals in none of which a clinical or other phenomenon suggested tuberculosis. A similar observation was made in many cases of typhoid where the subcutaneous injection of tuberculin proved to be positive. Whether this is evidence of an obscure and not accessible tuberculous focus, or based on other conditions, is not clear; with the impossibility, in the majority of these cases, to determine anatomically the presence or absence of tuberculosis, a large accumulation of suitable material must be observed to enable us to solve this point.

These observations, seemingly contradictory to the specificity of the reaction, do not interfere with the application of it, as the majority of cases of early tuberculosis, so-called incipient, and in the first stage, react typically. From the side of ophthalmologists are made serious objections against its use as causing, frequently, more or less discomfort, even, sometimes, purulent conjunctivitis and more serious and long-lasting disturbances. Sometimes, also, a general reaction obtains as in the old tuberculin injection. With proper care, however, and with a proper dilution, the subjective disturbance is slight and causes no discomfort. A great advantage is secured by the introduction of the conjunctival instillation of tuberculin, inasmuch as its range is much wider than the application of the subcutaneous tuberculin test. While in the latter, the slightest rise of temperature above normal is an absolute contraindication against it, this factor need not be considered in the ophthalmic test. In early cases, with no demonstrable bacilli, and without fever, a diagnosis can thus be made.

For injection, Calmette prepared a solution of the alcohol precipitate of the old tuberculin. This has been followed in England and in Germany. Lately, almost everywhere, a return to the old tuberculin has taken place. Citron considers it advisable to instillate one drop of a 2 per cent. solution into the conjunctiva of the inner canthus of one eye. If the reaction is positive, the other eye is instilled after some days with one drop of a 1 per cent. dilution. If no reaction occurs there, the diagnosis is nevertheless reliable (92 per cent.); in case the 2 per cent. solution proves negative, a 4 per cent. solution is used in the other eye. A negative effect excludes tuberculosis; a positive one is not reliable because this quantity will cause reaction in many healthy individuals. Great care must be taken to effect a full absorption of the tuberculin. The many clinical factors that mean a contraindication to the instillation, the presence of existing conjunctival or ocular disturbances or diseases, must be determined in every case as well as a predisposition to ocular catarrhs. The pathologic changes produced by the process vary greatly, from a mild congestion of the palpebral conjunctiva to involvement of the scleral conjunctiva, serous or even purulent exudate, to a definite conjunctivitis, and even more serious and long-lasting processes,—for instance pannus formation. The number of the latter, however, is small and in a collection of 100,000 cases, tabulated in Paris by Lapersonne only twelve are registered.

The experience so far obtained in the use of both reactions is, by this time, sufficient to permit of definite statements. There is no doubt that

both reactions must prove of immense influence on our scientific and practical dealing with tuberculosis. In the great majority of cases the establishment of a tuberculous process is possible by a method that subjects the patient to only very slight inconvenience, if any, and is as reliable, almost, as the subcutaneous injection of tuberculin. It may be said that a negative conjunctival or cutaneous test ought under circumstances subsequently be controlled by a subcutaneous injection. Moro has lately changed the method of cutaneous infiltration by a simple removal of the superficial epithelium with a razor. The raised area is rubbed with a mixture of equal parts of tuberculin and some oily material (lanolin) until a certain quantity is resorbed. The result is very conspicuous and the percentage of results is the same as with the abrasion method of Pirquet. This method is, in cured tuberculosis, to be preferred, as a negative result will prove the absence of any tuberculous tissue.

The theoretic interpretation of the process taking place, both in the cutaneous and conjunctival phenomena, has been made possible by the work of Wassermann in the essential nature of the subcutaneous tuberculin reaction. In the case of these late local reactions, phenomena take place that were observed by von Dungern, Roemer and Wassermann in other infections, the arising of localized areas of antibody formation—local immune areas. These areas are hypersensitive to the specific virus or toxin. Naturally they must, if brought in contact with a specific material, react quicker than an area not immune. In the latter, antibodies must be produced before reaction can occur; in the former the antibodies are present or are rapidly formed. That this is so, is shown by the observations by Cole on guinea pigs immunized against typhoid bacilli. The process of immunization with a larger number of bacilli requires weeks for the serum to reach the maximum of agglutinative capacity. If afterwards one waits until all of the agglutinins have gradually disappeared from the blood and then injects a dose of typhoid bacilli 10,000 times smaller than the first dose, the agglutinative capacity becomes rapidly, in a few days, higher than it was after the first inoculation. The biologic character of certain cells therefore must have been changed by the first injection in a way to make them quickly responsive to the specific agent.

The beginning of the conjunctival and cutaneous tuberculin reactions is quick after the application of tuberculin, in the conjunctiva, often in three or four hours, in the cutaneous six or seven hours. Delayed reactions are said to occur (three to four days) but they cannot be considered as conclusive because the long time shows that the affected tissues, by the effect of the material must have gradually adapted themselves to a specific reaction. All persons, immune against an infectious disease by passing through it, must give a quicker reaction to the introduction of specific substances than not immunes. For typhoid, as is well known, a reaction similar to the tuberculin reaction has been introduced by Calmette. Only few healthy persons, as said above, react like tuberculous individuals. In most of these the reaction is delayed. In the conjunctival and cutaneous tuberculin application, an immune area of tissue is produced that, later, reacts when tuberculin is introduced subcutaneously. Many reports are made stating that the conjunctiva of an instilled eye, or the site of a cutaneous infiltration, on the subcutaneous injection of tuberculin, later on will show the same reaction and sometimes much more pronounced than it was before. In a case of hip-joint disease (boy of 6 years) that received on general principles a tuberculin injection, and a Pirquet was made on January 22nd. A typical lesion was the result. On February 26th, the treatment began with 1-1000 mg. and

reached on March 27th, the amount of 1-10 mg. Five hours after the injection the site of the lesion, now scarcely perceptible, began to swell until the next morning a large area around it appeared greatly edematous and congested. Everything faded away until the following morning. There was no temperature except the regular rise (99.5) in the afternoon, and no other disturbance. The reaction was much more pronounced than the primary one, but passed away more quickly.

The literature on the subject is very extensive by this time. Its general expression allows us to hope that the new methods will lead us a long step forward in the recognition of early tuberculous processes, and therefore, to confine it more and more to a closed local disease and not to an open destructive process. It will help us to reach the goal so earnestly sought,—to deprive tuberculosis of its contagiousness, but to make it a trouble that with the methods now used mostly for the open and more or less hopeless stage will in the overwhelming majority of cases result in recovery.

THE RELATION OF DISEASES OF THE GASTRO-INTESTINAL TRACT TO DISEASES OF THE FEMALE GENITALIA.

A REVIEW OF RECENT LITERATURE.

By HUGO EHRENFEST, M. D.

1. BEZIEHUNGEN DER FLEXURA SIGMOIDEA ZUM WEIBLICHEN GENITALE.—Albrecht (*Arch. f. Gyn.*, Bd. 83, p. 216).
2. DOPPELSEITIGES METASTATISCHES OVARIALKARZINOM BEI PRIMÄREM KARZINOM DER FLEXURA SIGMOIDEA.—Brunner (*Zeitsch. f. Geb. u. Gyn.*, Bd. 61, p. 128).
3. DIE PHYSIOLOGISCHEN UND PATHOLOGISCHEN BEZIEHUNGEN DER WEIBLICHEN SEXUALORGANE ZUM TRACTUS INTESTINALIS.—Kehrer (*Berlin S. Karger*, 1905).
4. UEBER APPENDIZITIS BEI DER FRAU.—Klien (*Sammelbericht. Monatsch. f. Geb. u. Gyn. Dez.* 1906, p. 784).
5. UEBER DIE BEZIEHUNGEN ZWISCHEN FRAUENLEIDEN UND DARMLEIDEN.—Mueller (*Zentralbl. f. Gyn.*, No. 43, 1907, p. 1321).
6. MESOSIGMOIDITIS AND ITS RELATION TO GYNCOLOGICAL AFFECTIONS.—Ries (*Am. Jl. of Obst.*, May, 1907, p. 623).
7. GLEICHZEITIGES KARZINOM DES MAGENS, UTERUS UND OVARIEN, ETC.—Schenk und Sitzenfrey (*Zeitsch. f. Geb. u. Gyn.*, Bd. 60, p. 392).
8. Bland-Sutton. (*Brit. Med. Jour.*, May 26, 1908).
9. DIE ERGEBNISSE VON MAGENUNTERSUCHUNGEN BEI FRAUENLEIDEN.—Winkler (*Berl. klin. Woch.*, No. 33, 1905).

For obvious reasons the voluminous literature concerning appendicitis in women cannot be considered in this review. It is well known that appendicitis in the female offers many peculiar and important points in its relation to diseases of the genitalia. These points have been extensively discussed in the literature of the past few years, and we shall limit ourselves here to refer to the collective abstract of Klien (4) covering 45 of the more recent original contributions to this subject alone.

Only of late considerable interest has been shown in the relation of the sigmoid flexure to the female genitalia. Albrecht (1) rightly expresses his surprise that this interesting question has commanded so little atten-

tion heretofore, since size and position of this portion of the intestinal tract, anomalies in its development, the regular change of its position as the result of peristalsis and different degrees of filling, brings it into almost constant and ever changing contact with the uterus and its left appendages. There is a direct connection by way of the left infundibulo-pelvic ligament, which may permit the direct extension of pathologic processes from one to the other, both by way of the peritoneal surface and the subperitoneal connective tissue. The sigmoid flexure, like the bladder, must necessarily influence the position of the uterus, the left tube and ovary. In the opinion of many writers, in cases of obstinate constipation during the time of menstrual congestion the pressure of a filled sigmoid may give rise to typical dysmenorrhoeic pain which can be relieved by efficient catharsis. It has been claimed (Theilhaber, Gottschalk, etc.) that this pressure may cause chronic stasis in the uterus, finding its expression in profuse discharge, menorrhagia and other symptoms of endometritis. These are some of the direct mechanical effects of persistent filling of the sigmoid, but, as a rule, a chronic coprostasis in this portion of the intestine will lead to inflammatory processes in the intestinal wall—*sigmoiditis acuta and chronica*. Such an inflammation often will offer considerable difficulty in differential diagnosis from appendicitis and acute inflammation of the left uterine appendages, especially when occurring during the puerperium. In very chronic cases (hyperplastic sigmoiditis after Schuetz) the sigmoid flexure is palpable as a hard, movable, oblong and tender tumor. In these instances the diagnosis often is made difficult by the finding of an enlarged, tender ovary prolapsed into the posterior cul-de-sac, considered the cause of the patient's complaint, in fact only a condition developed secondarily by the sigmoiditis.

In older people a stenosing form of sigmoiditis is not uncommon, which may simulate carcinoma, often causing the formation of diverticula and in them of ulcerations. Such ulcers at times perforate and produce an obscure peritonitis, or, without perforation, lead to the formation of troublesome peritoneal adhesions. Such adhesions may fix, e. g., a pyosalpinx to the sigmoid; thus they are of practical importance in gynecologic operations. Gersuny has described such typical adhesions which impair the normal mobility of the sigmoid flexure and often suggest inflammatory processes of the genitalia as their primary cause. Albrecht emphasizes that the gynecologist must be familiar with the pathology and diagnosis of sigmoiditis and must be able to use the sigmoidoscope as well as the cystoscope.

Albrecht also speaks of mesosigmoiditis whose relations to gynecologic affections have been so clearly demonstrated by Ries (6).

Ries defines mesosigmoiditis as a condition of chronic inflammation of the connective tissue as well as the peritoneal covering of the mesentery of the sigmoid flexure. A secondary shrinking of the mesentery prevents the free excursions of this normally very movable portion of the intestinal tract, and then becomes a fertile source of great and sudden danger. One of the two main causes of this condition is a chronic inflammatory process extending from adjoining structures, particularly the rectum and the female sexual organs. This form of extension has been fully described by Virchow, and Freund has stated the fact that a *parametritis chronica atrophicans* is frequently associated with a mesosigmoiditis. Chronic inflammations and tumors of the left uterine appendages often lead to adhesions to the mesosigmoid. The symptoms of mesosigmoiditis are not very marked. At times the pain is sharp, but usually the patients drag along with a diagnosis of intestinal fer-

mentation or the like; they may get well and after some time the symptoms may reappear. In rarer instances the process of shrinking progresses, a typical ileus, due to volvulus of the sigmoid, develops, and during operation finally the correct diagnosis is made.

Similar views are expressed by Mueller (5). As the result of mechanical and chemical irritation in cases of obstinate constipation ulcerative processes may develop which finally lead to proctitis, perirectal exudates or abscesses. These processes can give rise to perimetritis and parametritis and result in various forms of malposition of the uterus. Mueller objects to the often repeated statement that 90 per cent. of all gynecologic diseases are directly or indirectly due to gonorrhea. He is inclined to believe that one would be more justified in claiming this as the percentage of the cases in which gynecologic diseases originate from the intestinal tract, including, of course, all the secondary affection of the genitalia following or coincident with appendicitis.

The most complete consideration of all physiologic and pathologic relations of the female genitalia to the intestinal tract is found in a book of Kehrer (3) which is entirely devoted to this problem.

Among the various original investigations made by this author those may be mentioned here which relate to the influence of menstruation and pregnancy upon the secretion of the various constituents of the gastric juice, and upon the peristalsis of the stomach. Kehrer concludes that the subjective symptoms of gastric disturbances during pregnancy are due partly to a neurosis affecting the sensibility, motility and the secretory function of the stomach. The dyspeptic symptoms often are caused by a diminished production of HCl. This same form of gastric neurosis at times is found associated with gynecologic disturbances appearing independently from pregnancy. Long continued uterine hemorrhages, malpositions and inflammatory processes, as a rule, lead to deficient acid secretion, and in cases of uterine cancer may develop into a complete achlorhydria.

Winkler (9) also investigated the secretory and motoric function of the stomach in 41 women who were treated for various gynecologic troubles. He found a normal chlorhydria in 11, hypochlorhydria in 20, achlorhydria in 5, but a hyperchlorhydria only in one patient. In 17 cases the total acidity was normal, in 2 above normal. In 30 per cent. of the cases the secretory function of the stomach was normal. In 18 of 31 patients a gastroparesis with motoric insufficiency existed. Winkler concludes that in all serious disturbances of the genital tract the secretory function of the stomach almost always shows some anomaly, as a rule, in form of hypochlorhydria. He established the interesting fact that the treatment of the gynecologic disease usually leaves the gastric disturbance uninfluenced, the latter calling for special medicinal and dietetic treatment.

In a critical review of the gynecologic literature of the year 1906 (INTERSTATE MEDICAL JOURNAL, February, 1907, p. 206) I had occasion to mention a number of articles dealing with the interesting and eminently important question of bilateral malignant growths of the ovaries as metastases of primary cancers situated in stomach, uterus, breast, skin, intestines, gallbladder and suprarenal glands. These organs are here enumerated in an order which according to Amann expresses the relative frequency with which the primary growth is found in them. A careful examination of all abdominal organs should precede every operation for ovarian carcinoma. Bland-Sutton (8) believes that the majority of bilateral solid ovarian tumors are carcinomatous, and, as a rule, are metastatic. Of women who died of gastric cancer in at least 10 per

cent. of the cases metastases are found in the ovaries. More recent contributions to this subject are reviewed in a paper of Brunner (2) in which he describes metastatic growths developed in both ovaries from a primary carcinoma of the sigmoid flexure. In a very thorough and interesting manner this question is also considered in a contribution of Schenk and Sitzenfrey (7), who conclude that in their belief the final results of the operative treatment of gastric and intestinal carcinoma, at least in women, could be improved by a systematic removal of both ovaries, even if they are found apparently normal on inspection.

TENDON, NERVE AND MUSCLE TRANSPLANTATION.

A REVIEW OF RECENT LITERATURE.

By NATHANIEL ALLISON, M. D.

The French Surgical Congress. Paris, Oct. 7th-12th, 1907. Section on Orthopedic Surgery. Reported by M. Péraire (*Revue D'Orthopédie*, March, 1908).

M. Gaudier (Lille). The proceedings of a surgical nature designed for the relief of flaccid and spastic paralysis, as a rule, fall under two heads; the transplantation of tendon to tendon, total or partial, or periosteal transplantation. The transplantation and suture of tendon to tendon should always involve the use of a normal tendon, either as a whole or in part, being inserted into a paralyzed tendon. The tendons that are used for transplantation should be selected after minute examination and study of the movements and the appearance of the limbs. It is very important that the two tendons should run in parallel directions for some distance. Deformity should be hyper-corrected and there should be enough tension put on the paralyzed tendon to hold the deformity corrected. Certain authors have a preference for muscular transplantations, using not only the tendons but portions of muscles. Such is the method of Drobniak, of Péraire, and of Mally. As to the suture material, the majority of surgeons use silk, others use cat-gut, silver, aluminum or bronze wire. Periosteal transplantation requires the insertion of the normal tendon and its suture directly into the periosteum, at times requiring the placing of intermediary continuation of a normal tendon with an artificial tendon of silk. This insertion should be very solid. Lange has shown on the cadavers of children that this insertion will stand a weight of 14 to 15 kilograms where 2 to 3 kilograms will rupture a suture of tendon to tendon. The majority of surgeons employ immediately after operation a retentive appliance; usually a plaster of Paris bandage which is to be replaced finally by an orthopedic appliance. Nothing is more variable than the period of time necessary to employ apparatus as an after treatment. The condition of the muscles alone and their power of movement and the stability of the part make it possible to determine this point, at the same time electricity, massage, gymnastics and hot baths should be employed always with the greatest prudence. We have in either muscle or tendon transplantation a therapeutic agent of real value, but to the author's mind that which is of real service, is the application of method and discernment in the treatment. The results of Volpius are for the most part of very high character in the mild forms, but it is better to do arthrodesis than to have the patient constantly wearing an apparatus. The transplantation of nerves, as applied to the treatment of paralysis of the limb, depends upon the considera-

tion of fifteen observations that have been published up to the present time to determine its value. Twelve of these cases were on the lower limb; eight of which resulted satisfactorily in that the deformity disappeared and there was return of muscular power. In the four others the result was of slight improvement or none. For the upper limb, two results were good and one was unsatisfactory. It is perhaps well in certain cases to employ nerve transplantation, but it should be remembered that such an operation may produce a lesion in a sound nerve, also that the paralyzed nerve should not be completely sectioned because one never knows if the nervous continuity may not be re-established; in fact that this may not have played an important part in some of the good results observed after these operations.

Kirmisson (Paris) stated that the determination of the usefulness of tendon transplantations in the treatment of paralysis is always most interesting. Statistics are often published that do not give the end result and he believes that often an immediate good result is transformed finally to a complete failure. What makes it difficult to estimate the results of tendon transplantations is that a large number of cases have been subjected at the same time as the transplantations to tenotomy, forcible correction and fixation of tendons. Infact, simple tendon transplantation in the treatment of infantile paralysis has been replaced by tenoplasty, a word which covers a great number of proceedings, making it impossible to classify and estimate the exact value of the results obtained of any given procedure. He has performed arthrodesis on 40 cases and has obtained good results. He prefers this operation where the paralysis is at all extensive, as it gives good results which have the advantage of being certain. Regarding spastic paralyses, the indications for tendon transplantations are very limited; good results have been obtained in infantile hemiplegia. In Little's disease, tendon transplantation does not seem to be indicated. Regarding nerve transplantation for the relief of paralysis, he states that the results have been too few and too recent to justify judgment of its merit. It is possible that this procedure will finally supplant tendon and muscle transplantation.

Hoffa (Berlin) stated that the aims of tendon transplantation are to produce in the paralyzed limbs its normal contour and its normal function. It is unsuccessful as an operation if these two objects are not met. Complete failure is exceptional however, and depends upon four principal factors: 1. Incomplete preliminary treatment; 2, inadequate plan of operation; 3, faulty operative technique; and finally, 4, insufficient after-treatment. The first thing to obtain is a correction of deformity or contracture before operation; the second consists in discovering the exact state of the muscles; that is, which are functioning and which are paralyzed; the third is to have an aseptic technique and to use silk that has been boiled ten minutes in 1-1000 bichloride solution. He believes in drainage for the first two or three days, closure of the skin with silk sutures and in performing the operation under the use of the Esmarch bandage. The muscle which is transplanted should be placed on a proper degree of tension, the limbs should be placed in hypercorrection. The two methods of transplanting tendon to tendon or tendon to periosteum are exactly similar, except that periosteal suture of tendons is preferable. He has employed artificial silk tendons only rarely. Post-operative treatment is of the highest importance. It is necessary to keep the limbs hypercorrected from six to eight weeks and to wear an apparatus for six months. This apparatus should keep the limb immovable, but massage, electricity and exercises should be employed. If all the muscles are paralyzed one must have recourse to arthrodesis. In spastic

paralyses, tenotomy of the antagonists, which are in a state of spasm, or a transplantation by a graft of the superfluous energy of the antagonists is the proceeding to be employed. Tendon grafting in Little's disease does not appear to him to have any advantage over simple elongation of tendons following tenotomy and correction of the members by an apparatus.

Mr. Robert Jones (Liverpool) stated that he has performed 253 transplantations of muscles and tendons, the complete statistics of which it is impossible to give. To his mind transplantations have for their objects the following: To strengthen a weaker group of muscles, to supply muscular force to a paralyzed muscle or muscle group, to diminish the over-action of a group of muscles in spastic paralysis, to transplant the action of a tendon that is exercising a vicious force or producing a deformity;—such as is the case in congenital club foot where a transplantation of the tendo-Achillis to the external side of the os calcis tends to correct the deformity. Finally these procedures may be aided by the use of arthrodesis. He has performed 51 cases of tendon transplantation, 167 periosteal sutures, 17 cases of osseous suture after tunnelization, 11 cases of muscular suture, and 7 cases of transplantation of tendo-Achillis. The best results have been obtained where tendons have been sutured into the bone or periosteum. He gives as the reasons for failure the following: Insufficient tension, insufficient correction of deformity, insufficient liberation of the transplanted tendon so that adhesions form, too much tension or complete want of tension on the tendon transplanted. He believes cases should not be operated upon until after the fifth year. By manipulation, by apparatus and tenotomies, he corrects the deformity and maintains the limb for a certain time in hypercorrection. He believes that careful observation and a careful technique will give 75 per cent. success in these cases. As to spastic paralysis he has done 10 transplantations; 4 times the flexors of the wrist into the extensors; 6 times the biceps or biceps and semimembranosus into the patella. The 4 cases of transplantations at the wrist represent 8 arms in which he had 3 completely successful. The 6 other patients represent 12 legs in which he had 6 successes and 4 improvements. In spastic paralysis he recommends excision of portions of the abductors and flexors of the leg and elongation of the tendo-Achillis. The limb should then be kept two or three months in extreme abduction. The transplantation of the biceps to the quadriceps has given him 3 good results, 3 partial successes and 3 complete failures. He has transplanted a portion of the tendo-Achillis in 15 cases of congenital club foot to the external side of the os calcis. Transplantation should not be done until 2 years after the establishment of paralysis. Failure results from lack of correction of deformity before transplantations, in using tendons that pull in the right direction, failure to properly suture the transplanted tendon, and lack of hypercorrection for sufficient period after operation. The limb should be protected after transplantation from complete weight of the body.

Lange (Munich) stated that success in tendon transplantation depends upon: 1, the adoption of a simple plan of operation and a total transplantation; 2, a rigorous aseptic operative technique. Silk used for suture should be boiled in a solution of 1-1000 corrosive sublimate and should be coated with paraffine. For 10 years he has employed nothing but periosteal transplantations. Post-operative treatment should be very carefully observed by the surgeon. In order to obtain abduction of the lower extremity he advises detachment of the great trochanter above the vastus externus, this is sutured with 8 or 10 strands of coarse silk to the iliac crest. The lack of success in tendon transplantation in the lower ex-

tremity, he attributes to adhesions. A transplantation will adhere very strongly to bone, ligaments, fascia or other tendons. In order to prevent these adhesions it is necessary to preserve and transplant as much as possible of the connective tissue and the adipose tissue that surrounds the transplanted tendon. If adhesions persist it is necessary to perform a secondary operation.

Volpius (Heidelberg) stated that he did not wish to attack arthrodesis as an operation. There are cases where it is necessary but it does not compare to tendon transplantation where the indications are the same. Lack of success following tendon transplantation results from not choosing the proper cases or from not choosing a proper operation. To his mind early operation is a crime. Intervention should not be made until a year after the establishment of paralysis. It is necessary to make careful plans as to the operation and these plans should be based upon an exact examination of the condition. He recommends electrical examination and observations of the active movements of the patient. As to technique he prefers transplantation entire to transplantation partial. He does not believe the method of Lange, consisting of periosteal fixation of the quadriceps to be useful. Artificial tendons are only rarely necessary and the paralyzed tendon offers enough solidity for suture. The results of tendon transplantations are not always durable, but this does not seem to be a reason for rejecting them as treatment. The causes of failure, depend upon the choice of the case, the plan of operation, the technique employed and the conduct of the post-operative treatment. This is made difficult, due to the fact that the patients are usually of the indigent class.

CORRESPONDENCE.

LONDON LETTER.

(FROM OUR OWN CORRESPONDENT.)

The clinical study of lunacy is not—to put it mildly—very satisfactorily arranged for in London, in spite of a goodly supply of institutions devoted to the care and treatment of cases of mental disease. Dr. Maudsley, F. R. S., whose name in psychiatry is far too well-established and universally known to need any further introduction, has just made a most munificent offer of 30,000 pounds to the London County Council “towards the cost of the establishment in London of a fitly-equipped hospital for mental diseases.” The gift has been accepted by the Council and there is now every prospect of seeing the realization of what has been hoped for and urgently wanted for many years. What is suggested is a hospital of 100 beds, carried on in the same way as the ordinary general hospital, with a visiting staff composed of men of eminence in this particular department, a resident staff, and a school for clinical teaching with laboratories for research. Much good and important work has been carried out in the Council's own Asylums, notably by Dr. F. W. Mott, but these institutions being rate-supported are not available for clinical teaching. Each medical school in London has its lecturer on mental diseases, all of whom are physicians of high repute, but the opportunity for individual treatment and close personal attention afforded by clinical study has only been possible to the few who could take up resident appointments the number of which is limited. Dr. Maudsley's munificence and the great public spirit displayed therein will be of enormous benefit to knowledge, and, therefore, through the profession to the patients themselves. It in no whit detracts from Dr. Maudsley's meed of praise to say that others of his own profession would readily emulate his example, other things being equal. There is much in the rough and tumble of practice that is distasteful, but no other profession or calling can claim such an ever-present and all-pervading sense of public-spiritedness, and one so insistent as to be accepted as a positive duty.

The Hospital Conference of 1908 met at the beginning of the month and discussed many things in connection with hospitals, large and small, without arriving at any very material results. This, perhaps, is not altogether unexpected, for although it boasts the sonorous title of the United Kingdom Hospitals Conference, it by no means represents the actual and responsible managers of the hospitals throughout the country. The burning question connected with hospitals in this country is the out-patient department. This applies more particularly, indeed almost exclusively, to hospitals in the large centres of population. The numbers treated as out-patients are an ever increasing quantity forming an evil which cuts many ways. On the one hand, the strain involved upon out-patient physicians and surgeons and upon the resident staffs of the hospital is far too great. In a great hospital the work, beginning at noon, lasts until quite late in the afternoon, leaving the presiding genius absolutely exhausted. Opportunities for teaching have to be scamped in order to cope with the crowd waiting to be seen and treated. Then, on the other hand, the general practitioners in the neighbourhood and beyond, have a legitimate grievance in that out-patient relief is fre-

quently granted to those whose position by no means entitles them to gratuitous advice and treatment. The system is in fact used as a weapon against them by those of the baser sort—of whom, alas! there are many. The practitioner values the privilege of sending up difficult cases for an opinion when the patient is unable to afford a consultant's fee, but he resents, very naturally, cases of ordinary ailments, which by right should fall to his share, receiving advice and treatment for nothing. The hospital and himself are both defrauded. To the former it is a flea-bite, but it is far more to the latter. Recent legislation anent the medical inspection of children in the elementary schools is now beginning to come with force and will most acutely aggravate the matter. The eye-hospitals have already refused to deal with the torrent of refraction work which threatens to engulf them.

The Royal College of Surgeons of England will soon be voting on the question of the admission of women to the College as members and Fellows. Two questions are asked, one as to the desirability of women being admitted as members by examination, and the other as to Fellows. The members have been asked to reply with a simple "Yes" or "No," but an attempt is being made to induce members to give a more amplified answer. The R. C. S. Eng. is one of the few fortresses still unstormed by the militant sisterhood. It would be just as well to accept the inevitable at once without more ado. There is no longer any great rush of women to take up medicine as a profession. The supply is suited to the demand, which is not great.

The University of London will be probably made the subject of an extensive inquiry before long. Speaking at University College, Lord Rosebery, who is the Chancellor of the University, intimated that he did not consider that the present constitution of the University was such as to enable it to undertake all the new duties continually imposed upon it. He raised the question as to whether the machinery was equal to the great strain or whether it had not already become superannuated. When the head of the University thus publicly raises the question, the matter is not likely to remain unnoticed. It will be a great day for London when her University is a real living factor and it is most sincerely to be hoped that the present Chancellor, having set his hand to the plough, will not leave the work unfinished. He has done good work for London before. As he is now detached from political life we may cherish a lively sense of favours to come.

May 5th.

PARIS LETTER.

(FROM OUR OWN CORRESPONDENT.)

The end of the nineteenth century saw a great change in the doctrines and theories of medical science, and this evolution has been emphasized very strongly during the last few years.

It would undoubtedly be an act of great injustice to underrate the importance of the labors of our predecessors, and it is quite true that their efforts are partly responsible for recent discoveries, but it is also very certain that the actual status of medicine today is noticeably different from that, for instance, of twenty-five years ago.

By virtue of the labors of Laennec and Cornil in France, of Virchow in Germany, pathologic anatomy had taken a place in the foremost ranks of medical science and it was thought to be the great beacon by the light of which the physician could, with the utmost clearness, conduct his researches and accomplish his cures. And the importance which was

accorded to the purely anatomic character of lesions, was shown by the fact that all medical treatises adopted pathologic anatomy as a basis for the classification of disease. Is there anything which shows up this line of thought more plainly than the division of liver diseases into atrophic and hypertrophic cirrhoses?

We know now that, notwithstanding the benefit which this systematic classification has rendered our clinical knowledge of liver complaints, it cannot be applied to all cases. We have to acknowledge, almost every day, that the symptoms of hypertrophic and atrophic cirrhoses are not always so sharply opposed to each other. In some cases the first condition may be accompanied by ascites and the second by jaundice, and admitting that the existence of mixed cirrhoses is, as Dr. Marcel Labbé has so judiciously observed, equivalent to an overthrowing of the anatomic-pathologic method of classification.

The history of nephritis has passed through the same vicissitudes, and the example furnished by hepatic cirrhosis is typical enough to make further comment unnecessary. Pathologic anatomy, notwithstanding its many lessons, has not been the means of explaining all the clinical manifestations of diseases, since the autopsies invariably show lesions in an advanced stage, while it is certain that the diseases which accompanied these lesions existed, clinically, at a time when the lesions themselves were not yet manifest enough to be appreciated. What we have said of pathologic anatomy can also be applied to bacteriology, which has given to a certain number of diseases an individuality of their own, but which cannot serve as the sole basis for a complete remodeling of the science of medicine.

To-day medical science turns to physiology to interpret, clinically, phenomena, thereby fulfilling the prophecy of Claude Bernard. Instead of looking for an anatomic lesion in the background of a clinical symptom, we now seek to discover what interference with a physiologic function has taken place, or the causes of its complete cessation. To be more exact, we endeavor to make the clinical syndrome entirely dependent on the alteration or suppression of a physiologic function. For this reason we find that uremia, instead of being classified according to its anatomic seat (respiratory, digestive, nervous uremia), is being defined according to its physiologic characteristics.

In accordance with the results obtained by MM. Widai and Achard, we speak of dropsical uremia with its edema and serous effusions, in contradistinction to dry uremia which is characterized by syncope and coma. In the first, we have a retention of chlorides, in the second, of urea. Singly, or together, these two groups of symptoms may be observed in the two kinds of nephritis—interstitial and epithelial. Consequently the object of the therapist is no longer that of attempting to correct an anatomic lesion,—the futility of which must be apparent to all,—but to prevent the retention of chlorides or of urea, as the case may be.

The study of the morbid manifestations determines the therapeutic measures to be used, and the duty of the physician is to find out what disturbance of a physiologic function causes the group of symptoms observed by him. This is the only way in which treatment can be followed rationally and with good results.

These examples, taken at random, undoubtedly show the present tendency of pathology. Here, unmistakably, we find a phase of continuous evolution. In conclusion let me remark that the conception of clinical conditions based upon physiology, gives to the treatment of disease a more substantial basis than did the theory of specific lesions.

May 10th.

LETTERS TO THE EDITOR.

EDITOR, INTERSTATE MEDICAL JOURNAL.

DEAR SIR:—In the May number of your journal you published a letter from Dr. C. A. Todd on "Eddyism" in which he makes a statement to which I take exception. He states that "the extensive spread of this epidemic [Eddyism] is explicable by reason of the cult being based on homeopathy." Dr. Todd's or any other person's statement to that effect has no weight except they can prove it. Anything based on homeopathy must be based on its law *Similia Similibus Curantur*. Now, pray, where in Eddyism do you find anything complying to this law?

From his derision of infinitesimal dosage I judge he arrives at the above conclusion. Yet a physician may prescribe large doses of medicine and still prescribe homeopathically, just so the prescription is based on the above law. Experience teaches him that the small dose acts better than the large, hence the small dose.

Dr. Todd's bringing homeopathy into the subject is certainly not in keeping with the times. First, because the more advanced men of your school grant us, at least, passive recognition. Secondly, he defeats the very object he desires to accomplish by making the homeopaths join with the Eddyites for common defense.

Now this last is very far from our wish. If Dr. Todd had ever read any of our society transactions, he would learn that we assail Eddyism as violently as do the other branches of legitimate medicine. We would gladly join Dr. Todd in his crusade if he did not put us on the defensive. Have him answer my question in the first paragraph and if he were misinformed about it, let him retract that statement.

Any attack at this time against homeopathy were ill advised in view of the fact of Sir A. E. Wright's recent discoveries on homeopathic lines.

Yours, etc.,

H. A. UHLEMAYER, M. D.

St. Louis, May 15th, 1908.

EDITOR, INTERSTATE MEDICAL JOURNAL.

DEAR SIR:—It would seem that my letter on "Eddyism," appearing in the May issue of your Journal, has been misinterpreted by some as an attack on Homeopathy because, among other reasons for the calamitous spread of that sect, I gave Mrs. Eddy's own statement that she based it on that part of Hahnemann's teachings known as the theory of infinitesimals. In her "bible" (Science and Health) she argues that if cures are effected by the administration of remedies so attenuated as to leave nothing behind of the original drug (Hahnemann's high attenuation—rising above matter into the spiritual, dynamic), then, as a necessary corollary, disease can have no real existence whatever—disease must be altogether a mental delusion, hence "Christian Science."

Now, whether Mrs. Eddy's argument is sound or not, whether she interprets suitably the scheme of Homeopathy or not, is none of my affair. Let my objectors argue with her. I am far from being desirous of figuring as her champion, quite the contrary. The following are specimens of Mrs. Eddy's logic: "Years of practical proof through homeopathy revealed to her (Mrs. Eddy) the fact that mind instead of matter is the principle of pathology" (Eddy. Miscellaneous works, p. 35). Mrs. Eddy at one time was a homeopathic practitioner. Further: "The highest attenuation of homeopathy and the most potent, rises above matter into mind, and thus it should be seen that the Divine Mind is the healer and that there is no efficacy in the drug. This discovery leads to more light. You say a boil is painful; but that is impossible, for matter

without mind is not painful. The boil simply manifests your belief in pain through inflammation and swelling; and you call this belief a boil" (Eddy. Science and Health, p. 153). "Metaphysics, as taught in Christian Science is the next step beyond homeopathy" (ibid. p. 156). I give these quotations in reply to letters received, asking for my reasons in stating that "Eddyism" is based on Homeopathy. I have no reasons in the matter at all. In my condensed sketch of Eddyism, I gave Mrs. Eddy's reasons; they are in no way mine and do not further concern me. But it does greatly concern me and must every medical practitioner that there flourishes here in our midst a monstrous sect that defies all sanitary law and cruelly sacrifices human life in obedience to the insensate commands of a Mrs. Eddy.

Yours, etc.,

CHARLES A. TODD, M. D.

St. Louis, May 18th, 1908.

EDITOR, INTERSTATE MEDICAL JOURNAL.

DEAR SIR:—The following letter was received by me from Dr. M. L. Heidingsfeld, 19 West Seventh street, Cincinnati, Ohio:

"MY DEAR DR. HOUWINK:—A recent article of yours in the INTERSTATE MEDICAL JOURNAL conveys the impression to me that you are the first to make successful moulages or wax-models in this country. I respectfully beg to call to your attention that Schamberg has written a monograph on this subject a number of years ago and that specimens have been collected and exhibitions made at various medical meetings by Schamberg, Wallis, Gottheil and myself for the past several years. To do justice to Schamberg and those who have emulated his painstaking efforts, I desire to make this correction.

Very respectfully,

M. L. HEIDINGSFELD."

I wrote Dr. Heidingsfeld, that I did not intend to convey the impression mentioned in his letter and requested him to carefully re-read my article, after which I expected him to agree with me that he was mistaken. However, looking again over my article, which is an abstract of a paper read by me before the St. Louis Medical Society, October, 1907, I find a sentence which might have conveyed an impression other than was intended. This sentence reads: "A few dermatologists in Eastern cities have some specimens bought in Europe, but a regular museum in this line is not found on this side of the Atlantic." Nowhere in the article did I claim to be the first who made moulages "successfully" in this country. In fact, no statement was made by me about my own work as being so. The purpose of my paper and article was simply to make my fellow physicians in St. Louis acquainted with moulages and to secure their coöperation in making a collection for St. Louis. It was therefore not necessary, in my opinion, to review the work done by others in this country. However, since Dr. Heidingsfeld received a wrong impression of my intention, I take great pleasure in begging the readers of this Journal, who read my article, to modify the sentence mentioned above, so as to read as follows: "A few dermatologists in Eastern cities have some specimens, bought in Europe—or made by themselves, as for instance Dr. M. L. Heidingsfeld of Cincinnati, Ohio,—but a regular museum in this line is not found on this side of the Atlantic."

You will oblige me greatly by having this letter printed in the next issue of the INTERSTATE MEDICAL JOURNAL.

Yours, etc.,

St. Louis, May 10th, 1908.

J. J. HOUWINK.

OBITER DICTA FROM FOREIGN JOURNALS.

THE PYTHAGOREAN IDEA OF DIET.

The Lyons (France) *Medical Journal*, in a recent number, gives many interesting details as to the dietary laws of Pythagoras, the famous Greek philosopher and mathematician, who was born in Samos, Greece, probably about 582 B. C. The details are taken from the works of Antonio Cocchi, a celebrated physician of Florence who lived between 1700 and 1750. The Pythagorean regimen consists of the habitual use of all fresh and young vegetables, in preparations which are bland or very weak; also roots, flowers, leaves, fruits and seeds. The use of all animal food, whether fresh or dried, is interdicted because of the volatility resulting from ingesting either meat or fish. While milk and honey enter into the diet, eggs are tabooed; and as regards drink, pure water unmixed with wine or any vinous liquid is allowed. On rare occasions it is permitted to lessen the rigors of the regimen by the addition of a small quantity of animal nourishment, provided the meat is tender and fresh, the preference being given to muscles rather than to the viscera.

In advocating his theories, Pythagoras had in view the health of the body and the mind; what he taught about the transmigration of the soul was merely a pretext to prevent people from eating animal food. The people, careless as to the real import of the true and natural laws as understood by Pythagoras, seemed to be open only to specious reasoning; therefore the philosopher thought it best to promulgate the idea, that only complete abstinence from the flesh of animals could prevent the strange punishments inflicted on those souls that were unfortunate enough to be transmigrated into the bodies of animals, as the result of a meat diet.

In reality, Pythagoras ate and advised others to eat, from time to time, fowl, suckling pig, veal and fish. He had not, as is generally believed, an abhorrence of the much-derided bean, a fact which should be of interest to all those students who have attached great importance to the legends anent the Pythagorean bean. Even so wise and genial a philosopher as Thoreau has been guilty of too great a belief in the Greek philosopher's vast prejudice, for in "Walden" he writes as follows: "Not that I wanted beans to eat, for I am by nature a Pythagorean, so far as beans are concerned." As is known to close students of Egyptian history, abstinence from beans was rigorously observed in Egypt; later the idea spread to Greece and Rome, and if Pythagoras advocated a similar ostracism, he was merely following in the footsteps of others, and was not, as has been wrongly supposed, the initiator of a crusade against a comparatively inoffensive vegetable.

THE TÜRCK-CZERMAK CELEBRATION IN VIENNA.

Gustav Killian, in the *Deutsche Medicinische Wochenschrift* of April 23d, pays tribute to the masters of medicine, Ludwig Türck and Johann Nepomuk Czermak, in an article that indelibly impresses itself on the

reader's mind. The following excerpt, though rather brief, will indicate the scholarly qualities of the writer: In the spring of the year 1858 the medical world was apprised of the discovery of the laryngoscope. Seldom, indeed, has a discovery, which at first was thought to be of only secondary importance, been attended with such far-reaching results. To-day, after the lapse of 50 years, we regard with pride the magnificent structure that has resulted from what one might call, a small corner stone in medical architecture. Out of this discovery a new, interesting and many-sided science arose; a science which brought immense relief to suffering humanity.

Since the beginning of the art of medicine, there have been discoveries in connection with laryngology. But the first half of the 19th century was really the period when great progress was made for then Bozini wrote his work on a new method of illumination, and a number of men, such as Senn, Babington, Bennati, Baumes, Liston, Avery and others, attempted to examine the larynx by means of a mirror. The anatomist, Henle, the physiologist, Johannes Müller, and above all the pathologists, Cruveillier and Rokitansky, paid especial attention to the larynx. At the same time the clinicians, Albers, Ryland, Trousseaux, Belloc, Rühle, Friedreich, devoted considerable study to the diagnosis and therapy of laryngological diseases. Thus it happened that at the end of the first half of the 19th century, diseases of the larynx were reckoned with the most important diseases in the whole range of pathology.

Despite the progress noted above, how unimportant it all appears when compared with what has been accomplished in very recent times! What problems remained unsolved in those days! How limited was the knowledge of therapeutics! The times were ripe for a change and its possibilities were apprehended by many. Suffering mankind grew more and more insistent. The coming of the solution of the problems of laryngoscopy was, so to speak, in the air.

In 1854 Manuel Garcia—recently deceased at the age of 100 years—succeeded in examining his own larynx by means of a mirror. But to Ludwig Türck belongs the honor of being the first one to accomplish what surely must be reckoned a feat, for in Vienna in 1857 he not only examined but demonstrated the interior of the larynx of a patient by using a laryngoscope. At last the science of medicine reached a long-desired mile-stone in its progress! At this time Ludwig Türck was 48 years old. He had accomplished much as a neurologist. But from now on a new province of medicine was to be the seat of his activities. However, fate ordained that some time before his studies were completed and the results of his investigations were made public, a formidable rival would arise in the person of Johann Nepomuk Czermak, the then physiologist at Budapesth. An emulation of a high order between the two men took place, which called into play the best expression of their mental forces. Czermak utilized his experiences derived from his knowledge of optics, employed artificial light instead of sunlight, dedicated his labors principally to the technique and merely used his clinical studies as a means of illustration. Türck's ambition, on the other hand, was purely clinical, his one desire being the relief he could bring

to the afflicted with the help of his ever-increasing knowledge of laryngological diseases and the newest methods.

With the laryngoscope Czermak taught the medical world how to examine the trachea from above and through the wound resulting from tracheotomy; the interior of the pharynx and the posterior nares. Coeval with these advances in the laryngological field, Türck was unremitting in his endeavors to effect a new idea of the diseases of the larynx and trachea as the result of laryngoscopy. In 1866 he published his never-to-be-forgotten classical contribution and thus completed his life's work. Soon after (1868) death set in after a brief illness. And strange to say, about this time, Czermak ceased to be a force in the province of laryngology.

But the seeds had been sown and throughout the world a full fruition resulted. Authorities such as Störk, Semeleder, Gerhardt, Lewin, Rauchfuss, Voltolini, Viktor v. Bruns, Waldenburg, Traube, Tobold, Mackenzie, Elsberg, Mandl, Moura-Bourillou, Fauvel, Oertel, Gottstein, Wilhelm Meyer, Navratil, Lóri, Krishaber, v. Ziemssen, Schnitzler, Leopold v. Schrötter, and later Rossbach, Riegel, Bäumler, Solis Cohen, Massei, Bschorner, Hopmann, Schech, Sommerbrodt, Burow, besides others, devoted themselves scientifically and practically to a furtherance of the new and revolutionary interpretation of nose and throat diseases. Nearly all these men were young when they took up their specialty, and those who were slightly handicapped by middle-age, were fortunate in having the enthusiasm of youth. And it is well here to dwell on the advantages of youth and the quality which generally accompanies that desirable age—enthusiasm—for without both, there can be but a poor adaptability to those latest phases of any scientific subject, which breathe the spirit of revolt against antiquated teachings and a poor and clumsy technique.

HISTORICAL NOTES.

THE OATH OF HIPPOCRATES.

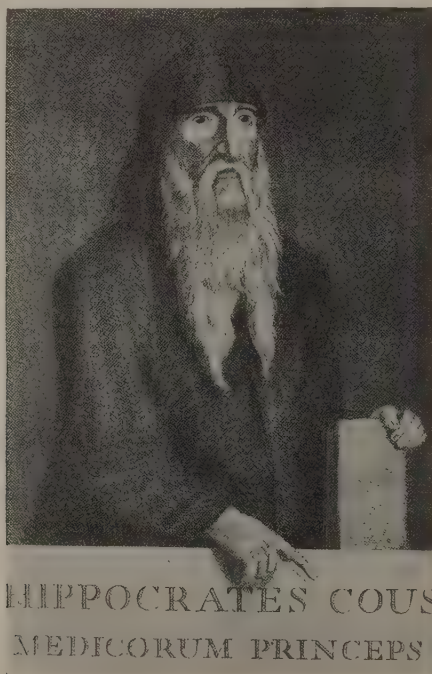
Although every physician has read the Oath of Hippocrates it is of so great an historical and archæological value that we are sure our readers will be interested in a translation of a Latin version made by John Young, Keeper of the Hunterian Museum, Glasgow.

"I swear by Apollo, the physician, and Aesculapius and Hygeia and Panacea, and I call to witness all the gods and goddesses, that I will, to the best of my power and judgment, keep this oath and this written declaration in its integrity. I shall hold him, who has taught me this art, as a parent. I shall devote my life to him, and shall supply him with all of which he has need. I shall regard his sons as my brothers, and, if they wish to be taught, shall teach them this art without fee or indenture. I shall make sharers in the teaching by precepts, and listeners to the oral instruction, and participators of the other modes of instruction, both the sons of my own teacher and those who have bound themselves by indenture and dedicated themselves by the medical oath; but none others. Further, so far as concerns the healing of patients, I shall prescribe to them, as my powers and judgment direct, suitable diet, and shall forbid what is detrimental and injurious. No entreaties shall induce me to give anyone noxious drugs, nor shall I take part in any such counsels. Likewise I shall exhibit to no woman any pessary which shall destroy her fruit at an early or late stage of pregnancy. I shall conduct my life and practice my art in holiness. Nor shall I cut even those who entreat me, but shall leave them to those who practice such surgical operations. Whatever house I enter, I shall do so for the good of the sick, and shall abstain from every hurt or injury, as well as from sensuality with man or woman, bond or free, whose body I have to cure. Whatever I shall hear or see, even when not called in for medical attendance, whatever I shall come to know in the ordinary intercourse of life, which it would be improper to repeat, I shall keep silence regarding it. I shall hold it secret. May I, keeping this oath in its entirety, enjoy my life and art in happiness, and have credit among all men for all time. May the opposite befall me if I break it."

Although the authenticity of this Oath has been doubted in high quarters, its bearing on the conduct of all honorable physicians from time immemorial, has been of so great a value, that, authentic or not, the oath stands for much as a summary of the very highest principles—a medical guide, so to speak, without equal.

Here is no lip-service in the cause of the art of medical practice such as we moderns are called upon to applaud on many occasions—impelled thereto by the indiscriminations of the uncritical who cannot differentiate between dross and the rich residuum of noble thought—but a message whose every word, on account of a remarkable intuition and an illimitable sincerity, must carry home to us, almost daily, the only interpretation of the temper and manner of the physician, whose medical life is a dedication to an idealism wrought from a manifold experience. Lessons pertaining to conduct, when scattered throughout many books, lose their value for the reason, that effectiveness suffers and intent is sadly weakened by the deplorable process of attenuation resulting from their passage through the crucibles of modern commentators. But when the

whole philosophy of a system to elevate a calling is contained in a few lines, and each line is informed with a thought that could be expanded into a many-paged essay, the succinctness of the whole, by virtue of the quality whereby a thing can be easily and readily memorized, must count for much in shaping the forces from within and without—the intellectual striving after idealism and the weakening of a gross materialism. And, that this mooted Oath of Hippocrates is not without worth and value, the indignation and resentment which to-day characterize medical thought when outraged by despicable performances of vainglory and cupidity, attest.



Autocracy, as a means of educating others to our way of thinking, breeds only a bitterness of soul which leads to open revolt. It fails of good results because it lacks the gentleness and mental serenity which are foreign to an insistence founded on narrow-mindedness and the worst sort of puritanism. But precepts when conceived in the spirit in which the Hippocratic Oath was conceived and characterized by their terseness and directness, must necessarily bear fruit in all minds made receptive by the right sort of preliminary education. For they indicate the best that there can be of an introspection occurring in a scholar and philosopher—an iron-heeled destruction of those baser qualities inherent in our defective and dual natures, and a resultant elevation of thought that resolves itself into the kindest feelings for others, in so far as there is a complete absence of censoriousness, and the presence of a half-hidden hope that the thinker's severity toward himself might be the means of influencing others into his way of thinking.

BOOK REVIEWS.

A TEXT-BOOK OF EMBRYOLOGY. By John C. Heisler, M. D., Professor of Anatomy in the Medico-Chirurgical College of Philadelphia. Third revised edition. Octavo volume of 432 pages, with 212 illustrations, 32 of them in colors. Philadelphia and London: W. B. Saunders Company, 1907. Cloth, \$3.00 net; Half Morocco, \$4.25 net.

The new, third edition of this work represents all the latest advances made in the science of embryology. Many portions have been re-written, and a great deal of new and important matter added. Heisler's embryology thus promises to remain the standard text-book.

ELEMENTS D'OBSTETRIQUE. Par le Dr. V. Wallich, Professeur Agregé a la Faculté de Médecine de Paris. G. Steinheil, Editeur, Paris, 1907. Price: Fr. 8.00.

"Essentials of Obstetrics" in our literature would indicate a little volume "especially adapted" to the needs of the student who is about to take an examination. He would feel disappointed in the neat little volume before us. It presents the scientific and practical "elements" of obstetrics in such complete form and contains so many new and original ideas of its author, that one cannot help wondering how all that knowledge could have been compressed into this small-sized book. Of course, this is partly accomplished by extensive use of a size of type which calls for the assistance of a strong reading glass, but is actually effected by most careful phrasing with the elimination of every unnecessary word. A short sentence like, "A large number of striae indicate a bad condition of tissues; in such patients it will be difficult to avoid rupture of the perineum," contains in a very precise form the result of an undoubtedly very large number of observations, and at the same time contains information which will prove new to many a specialist.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF WOMEN. By Harry Sturgeon Crossen, M. D., Clinical Professor of Gynecology, Washington University, St. Louis, etc., etc. With 700 illustrations. C. V. Mosby Medical Book & Publishing Company, St. Louis, 1907. Price, \$6.00.

The characteristic features of this work are so precisely stated by its author in the preface that we can not do better than quote his own words in an attempt to convey to the reader an approximate idea of the scope of this unique text-book.

"This work is devoted exclusively to the diagnosis and treatment of diseases of women, as those diseases are met with in the office and at the bedside by the general practitioner. No space is given to other considerations (etiology, pathology, major operative technique), except as necessary to bring the work to its highest usefulness as a practical guide in the lines indicated.

"My endeavor all the way through has been to present the important points clearly and systematically—so clearly and systematically that they will be readily understood and well retained in mind for use at the bedside. To this end much thought has been given to the arrangement of the text, so as to show not only the facts of a subject, but also the mutual relation of the facts and their bearing and relative importance in the diagnosis and treatment."

It hardly can be said that American literature is wanting in good and even excellent works on gynecology, but, on the other hand, as compared, *e. g.*, with German literature it certainly does not contain many works which could be regarded as satisfactory text-books for students. It is one thing to present all phases of modern gynecology in a thick, profusely illustrated volume, and another to produce a text-book of gynecology which can be read and understood by the average student. This difficult task has been accomplished in a most happy and satisfactory manner by Crossen. His text-book is *clear* and *systematic*, possibly more so than any other English text-book of gynecology extant. In the opinion of the reviewer it will prove of interest to the practitioner, of value to the student, and indispensable to every teacher who takes a serious view of his difficult task of introducing his students into the intricate problems of diagnosis and treatment of gynecologic diseases.

HEILENDE STRAHLEN. ARBEITEN ÜBER DIE GRUNDLAGEN UND DIE PRAKTISCHE AUSÜBUNG DER STRAHLENTHERAPIE (X Ray Strahlung, Lichtstrahlung und

Radioaktivität). Gesammelte Aufsätze von Ingenieur Friedreich Dessauer, Band II. Preis Mark 3,20. Würzburg, A. Stuber's Verlag, 1908.

It is three years since the first band of "Heilende Strahlen" appeared, which was so well received by the medical profession. It is a great pleasure to announce this second set of monographs by the expert röntgenologist, Dessauer. The great value of these articles, from a scientific as well as from a practical standpoint, can be understood only by one who uses the x ray extensively and who has studied its properties. The beginner will hardly find a better book for his necessary study.

RÖNTGEN KALENDER. Begründet und herausgegeben von Prof. Dr. Ernst Sommer. I Jahrgang, Preis Mk. 3. Verlag von Otto Memnich, Leipzig, 1908.

This first calendar on Röntgen Ray diagnosis and therapy should be in the hands of every physician who uses the x ray. The amount of valuable information given in this little book is surprising. Articles on the history of röntgenology, on the technique and röntgentherapy by such experts as Sommer, Dessauer, Wetterer and Holzknecht, are always worth reading, and so are the papers on pathology and therapy of the x ray ulcer by von Kirystalowicz and the hints to physicians who are thinking of buying x ray outfits.

HORTON'S SYSTEM OF MEDICAL BOOKKEEPING, CONSISTS OF PHYSICIANS' PERPETUAL POCKET RECORD SHEET, AND PHYSICIANS' PERPETUAL SINGLE ENTRY DAY-BOOK AND LEDGER. Dr. Alexander F. Horton, publisher, 944 Marcy avenue, Brooklyn, N. Y.

The unique record sheet is adaptable to any number of patients, 240 names being visible with the ease of turning a page in the old style bulk visiting list. It is light, thin, carried with or without a wallet, consulted without turning leaves, posted as often as filled and then filed. Price for thirty patients a week is \$1.00. Larger ones proportionately higher prices. Leather wallet, with pocket, 50 cents extra. May be used with any kind of ledger.

The office ledger differs from any other on the market, is always posted as entries are made, a gauge at line in use giving statement to date instantly. Saves frequent transferring and reindexing of accounts; good until filled; may be used with any pocket record. Price \$6.00 net and express charges. Descriptive printed matter sent on application. We cordially recommend these labor saving books to such of our readers who desire to increase their collections by an easy, simple method of keeping accurate accounts.

DIE PATHOLOGISCH-HISTOLOGISCHEN UNTERSUCHUNGSMETHODEN. G. Schmorr. Vierte Auflage. Leipzig, F. C. W. Vogel, 1907.

The three former editions of this book are in universal use by pathologic workers. The appearance of the fourth has only added to the high appreciation entertained from the beginning for the work of the author. There is no other book on pathologic histologic methods that deals with the subject in such an objective way as this book by Schmorr, demonstrating in every instance the extensive experience and critical consideration of the multifold methods of investigation. The justification for such authoritative interpretation is given by the author's original improvements of older methods and by the establishment of methods, that in some directions, for instance the study of bony structures, have resulted in important scientific knowledge of the structural features of osseous tissues, previously incomplete. It is hardly necessary to call special attention to this book, because the appearance of a new edition will intuitively be the evidence that all who are acquainted with the older ones, will be benefited by the fourth edition. It is far superior to any other treatise on the subject, because it is based on the experience and critical interpretation of a man who, by his work, has advanced pathologic knowledge immensely.

A LABORATORY MANUAL OF INVERTEBRATE ZOOLOGY. Gilman A. Drew. W. B. Saunders Company, Philadelphia and London, 1907.

The work of Drew is the outcome of the instruction given at the Marine Biological Laboratory at Woods Holl, Mass. The work is characterized by an attempt to avoid teaching so-called typical phenomena and to lay the main stress upon the factor of adaptation. Therefore the discussion of single problems is studied with the view of demonstrating the variation in the processes of obtaining an identical effect, a method that, unfortunately, has been considered too little in many biologic and especially developmental and evolutionary problems. The diction is clear and definite and the subjects selected are presented in a form that stimulates thought and endeavor for original investigation. The little volume will be welcome and valuable to the study of the

biology of lower animals, not only to beginners, but also to workers who, perhaps, spend their time upon questions less important than those dealt with in this book.

A MANUAL OF MEDICAL TREATMENT OR CLINICAL THERAPEUTICS. I. Burney Yeo. 14th Edition. W. T. Keener & Co., Publishers, Chicago.

The first edition of this work was published in 1893, since which time fourteen editions have appeared, indicating the popularity and usefulness of the work. The author has endeavored to study diseases from the point of view of treatment. It is by the examination into the causation of diseases and the investigation of the true nature of the morbid changes, together with an exact knowledge of the properties and mode of action of drugs, that rational indications of treatment are arrived at. This work, in two volumes, presents in a concise form the rational indications for treatment and the mode of carrying them out. Special chapters are devoted to diseases of the organs of digestion, diseases of the heart and blood-vessels, of the blood and ductless glands, of the organs of respiration, tuberculosis, diseases of the liver, of the urinary tract, of the nervous system, constitutional diseases, and specific infectious diseases. The character of this work is too well known to need further comment.

INDICATIONS FOR OPERATION IN DISEASES OF THE INTERNAL ORGANS. Prof. Hermann Schlesinger, Vienna. Authorized English Translation by Keith W. Monsarrat. E. B. Treat & Co., New York City.

In view of the rapid development of the surgery of the internal organs, there is perhaps no chapter in medicine more important for internists than that of surgical indications. Unfortunately, there is in our colleges no chair devoted especially to a consideration of this subject. This knowledge, therefore, must be gleaned from experience and the observations of authorities on the subject. Schlesinger has written this work essentially for the practitioner. Chapters are devoted to the surgical indications in diseases of the brain, spinal cord, peripheral nerves, neuroses, diseases of the larynx, bronchi, lungs, pleura and mediastinum, diseases of the heart, blood vessels, indications for venesection, diseases of the mouth, oesophagus, stomach, intestines, peritoneum, gall bladder, liver, spleen, pancreas, diseases of the urinary tract, joints and bones. Chapters are also devoted to indications for the induction of premature labor, operations on diabetics, and a chapter on the general influence of operations on the body. After all, the practitioner must first set the indications for operation, and he should be no less posted in matters of this sort than is the surgeon himself. A careful perusal of this work will aid him materially in fixing the indications for surgical interference.

DIET IN HEALTH AND DISEASE. Julius Friedenwald and John Ruhrah. Baltimore. 2nd Edition, revised and enlarged. W. B. Saunders & Co., Philadelphia and London.

The modern tendency in therapeutics, both in the teachings in our institutions and in the practice of the scientific physician, is toward fewer drugs and greater attention to dietetics and hygiene. A very large percentage of diseases may now be treated wholly throughout their entire course by rational dietetics and hygiene. Typhoid fever and pneumonia, in fact, the acute infections in general, may be treated almost wholly without the use of drugs. The diseases of the gastro-intestinal tract require for their proper treatment a profound knowledge of diet. Infant feeding depends wholly upon this knowledge. The conducting of rest cures, which have taken such an important place in the treatment of nervous cases, presupposes a thorough knowledge of dietetics. A work such as this is bound, therefore, to fill an important place in the library of one who desires to treat diseases according to rational indications. The authors have taken great pains to prepare a work that covers quite thoroughly the subject of dietetics.

THE PRACTICE OF MEDICINE: A TEXT BOOK FOR PRACTITIONERS AND STUDENTS WITH ESPECIAL REFERENCE TO DIAGNOSIS AND TREATMENT. James Tyson, M. D. 4th Edition. P. Blakiston's Son & Co., Philadelphia.

A work on the practice of medicine prepared by Tyson recommends itself to everyone acquainted with the history of medicine in this country. This work is prepared with the same care that has always characterized his efforts. It embodies almost purely the personal work of the author, with the addition, of course, of that broad knowledge of the subject with which every medical writer of worth must credit his colleagues. Chapters are devoted to infectious diseases and diseases of the digestive, respiratory, circulatory and

nervous system, as well as diseases of the blood and blood making organs, the thyroid gland, constitutional diseases of the muscular system, intoxications, animal parasites, etc.

THE SEXUAL QUESTION. A Scientific, Psychological, Hygienic and Sociological Study for the Cultured Classes, by August Forel, M. D., Ph. D., L.L. D., formerly Professor of Psychiatry and Director of the Insane Asylum in Zurich (Switzerland). English adaptation by C. F. Marshall, M. D., F. R. C. S. Late Assistant Surgeon to the Hospital for Diseases of the Skin, London. Rebman & Co., New York, publishers.

That subject of perennial interest to sociologists, psychologists and pathologists—the relation of the male species to the female as regards the sexual life—has received a fresh impetus in Professor Forel's book. Unlike most authors when dealing with the delicate matter of sexuality, Professor Forel never lapses into the deplorable tone of the unscientific, but always evinces an exalted and dignified attitude coupled with seriousness of thought and width of outlook. That the book will be of service to those whose studies have carried them into the realms of the abnormal where the debatable questions as to the suppression of prostitution, the *raison d'être* of sexual perversion, and the recognition of the third sex are under discussion, goes without saying; but even though "the cultured classes" may be indifferent to these problems, there is enough of interest in the work, as regards the evolution of normal sexuality, to hold their attention. The latter is not so unimportant as many doctors would have us to believe, for by close attention to its many stages, misconception of what is really normal in our sexual life, would be done away with, thereby inducing a calm philosophy on the part of the doctor, so that a means would be at hand to combat the mental anguish of the ignorant when obsessed by sexual delusions.

OPERATIONS OF GENERAL PRACTICE. Edred M. Corner, M. A., M. C., M. B. (Cantab.), B. Sc. (Lond.), F. R. C. S. (Eng.), and H. Irving Pinches, M. A., M. B., B. C. (Cantab.), M. R. C. S., L. R. C. P. (Lond.). Pp. 296. 170 illustrations. Cloth, price, \$5.50. New York: Oxford University Press, 1907.

In the preface, the authors clearly set forth the object of this book. An attempt has been made to meet a deficiency in medical education. Only a small number of students enjoy the privilege of post-graduate work in a hospital of the first rank, and consequently they enter the profession with an education which is deficient in the practice and performance of the many small operations which lie on the borderland between medicine and surgery. The object of this book is to familiarize the practitioner with these surgical proceedings which all physicians are frequently called upon to perform and which are not sufficiently elucidated in many of the larger surgical works. The authors have not attempted to discuss the larger surgical problems and operations but have confined the volumes to minor surgical procedures. The book is well printed and the illustrations are excellent.